THE PAPER INDUSTRY and PAPER WORLD

N EDUCATIONAL NEWS MAGAZINE — JUNE, 1938

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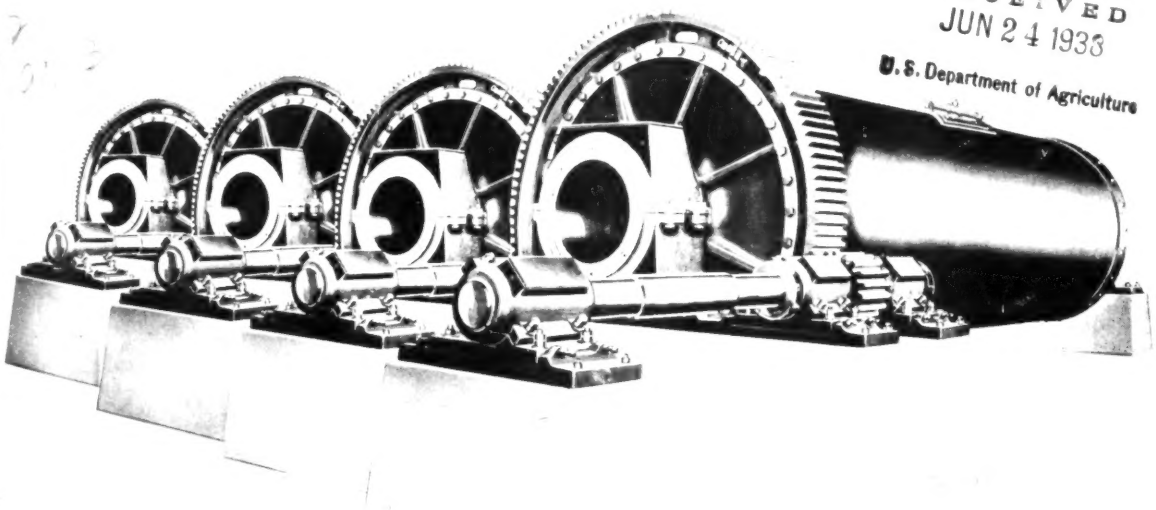

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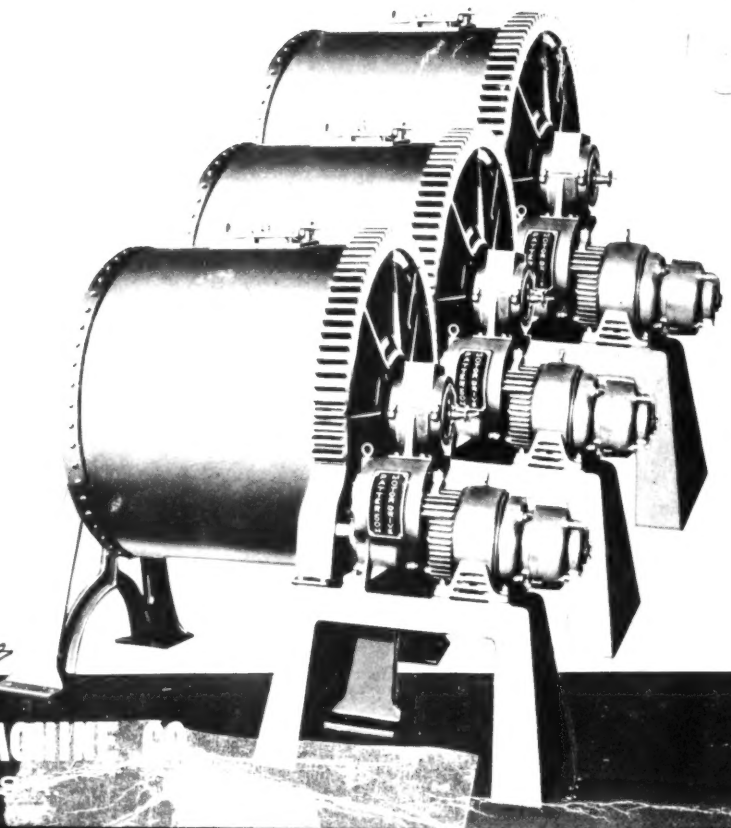
Batch Type and Continuous Feed and Discharge

Plain and Jacketed types, for grinding and mixing at controlled temperature and under pressure or vacuum — drying, chemical reaction, distillation and recovery of solvents, gas absorption and aeration.

Richard L. Cameron
President



THE PATTERSON FOUNDRY & MACHINE CO.
EAST LIVERPOOL, OHIO, U.S.A.

STANDARD OIL COMPANY'S
New STANOIL
cuts costs in circulating system lubrication
THE cost-saving possibilities of higher-grade lubricants in circulating systems are being proved, in instance after instance, by *Stanoil*—the latest development in fine lubrication for this service.
Three definite qualities in Stanoil bring specific improvements in circulating system operation. Higher stability means greater resistance to sludging—cleaner systems and longer oil life. Greater demulsibility provides easier separation from water—less loss of oil. Better viscosity index assures less variation in oil body under wide ranges of temperatures—wear-resistant lubrication under all conditions.
Standard Oil Company specializes in high grade lubricants such as Stanoil. But that's not all. Standard Lubrication Engineers will show you how to get *lower cost lubrication* with these *improved products*. These lubrication specialists, located throughout the middle west, are ready to help you get reduced wear, lower maintenance and lubricant costs that better lubricants will bring.
Ask the regular Standard Oil Representative that calls on you to explain this engineering service. Or write for the booklet, "The Lubrication Engineer—His Value to You." Address Standard Oil Company (Ind.), 910 South Michigan Avenue, Chicago, Illinois.
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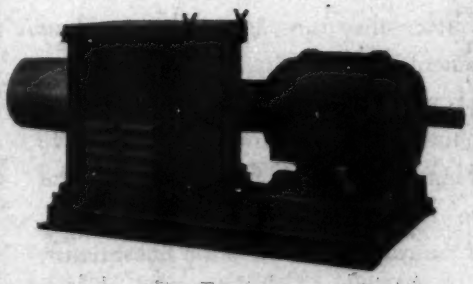
THE RIGHT LUBRICANT
PROPERLY APPLIED
TO REDUCE COSTS
STANDARD OIL COMPANY (INDIANA)
LUBRICATION ENGINEERING

The Harland System of Paper Machine Drive as used on this 202" book-paper machine (1) makes use of an individual electric motor for each section of the machine; (2) controls the motors as a group from a variable-voltage generator to provide the range of linear speeds required; (3) interlocks the several section motors with the Harland mechanical differential regulators to positively maintain "draws" between sections.

RELIANCE SECTIONAL *Paper-Machine* DRIVE

HARLAND SYSTEM



Section Interlock with synchronous motor for Harland Drive. This compact, responsive unit used at each section is the "heart" of the system. It is a mechanical differential regulator without mystery which serves to interlock the several section motors and maintain "draws" between sections.

A Drive For Universal Use

Evidence. It is used successfully . . . on the largest board machine in the world; . . . for wide, high-speed news machines; . . . for a small, fine-paper machine operating from 40 to 200 feet a minute.

Advantages. It helps you to step up quality and push down cost. . . . Machine speeds are readily adjusted and "draws" between sections are positively maintained. . . . It aids in producing paper that is homogeneous, even in thickness, and uniform in strength and quality. "Broke" is reduced. . . . The drive is simple, efficient, quiet and dependable; parts are easily available for inspection. Automatic protective features insure safety for machines and operators.

More than 200 Harland Drives are now in operation in 22 countries.

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Where Mineral Fibres Prove the Quality of Felts

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And because Hamilton Felts are unusually good felts they are generally standard equipment with asbestos paper machines. Long runs, high speeds, freedom from stops and shut-downs, avoidance of breaks, prove that Hamilton Felts are the most economical where technical difficulties are greatest. From the coarsest board to the finest tissue, there is a Hamilton Felt that will do the job better and at lower cost. Prove it on your own paper machine.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills, Established 1858 •

Hamilton Felts are marked by two blue lines full width of the felt and by one shorter blue line midway between them.

Hamilton Felts

5 ways NORWOOD CALENDERS Can Help You Cut Costs

In 1912 Norwood built the first Glassine Calenders built in this country. Constant improvement has been made.

Norwood Calenders can help you in the smooth, profitable operation of your mill in these five ways:

1. **Norwood Calenders reduce brokage.** Specially designed intermediate roll boxes stay set. They won't work loose and get out of alignment. The adjustable fly roll bearings can be adjusted to any angle. The calenders don't vibrate. They are built extra heavy to take punishment.

2. **You can cut your power consumption with Norwood Calenders.** The complete continuous oiling system, with oil pumps and filter — the specially designed bearings — the new power-saving drive — all help in cutting down your power consumption.

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4. **Handle paper faster, keep calenders operating more hours per week.** The special Norwood reel speeds up the handling of rolls of paper before and after calendering. Convenient controls handy for the operator make it possible to get started quicker and easier. Top, bottom, and intermediate rolls are removable without disturbing the set of other rolls. Norwood repair and replacement service is quick and efficient. You'll have your Norwood calenders tied up less time for replacement of rolls or for any necessary repairs.

5. **Better calendering in less time with Norwood Calenders.** Norwood calenders are based on over forty years' close work with paper mill men. Norwood's rolls are made to specifications so they will stand up and do better work. You can depend upon a good finish with Norwood Calenders.

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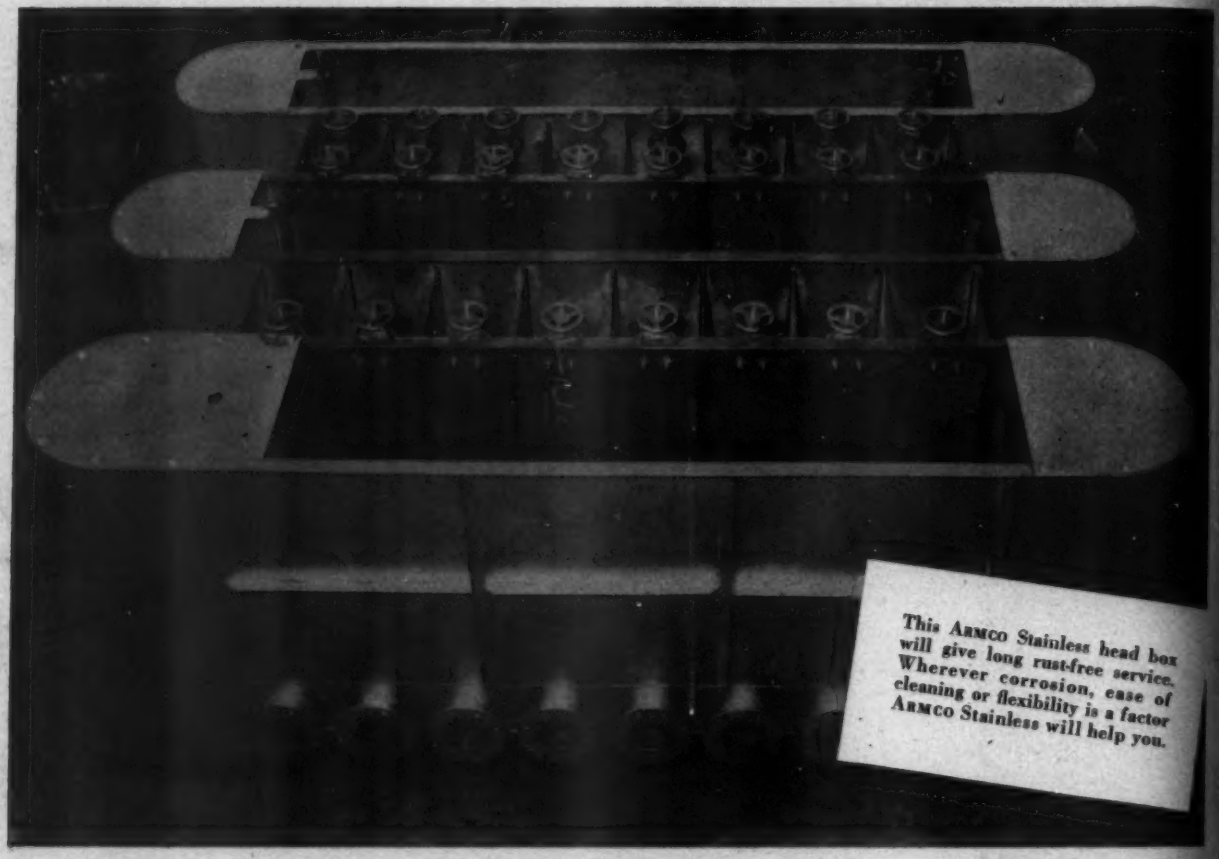
HOW ARMCO STAINLESS

HELPS THE PULP AND PAPER MAN


This ARMCO Stainless head box will give long rust-free service. Wherever corrosion, ease of cleaning or flexibility is a factor ARMCO Stainless will help you.

Now pulp and paper producers can have definite control over corrosion of their paper making equipment.

Here is a metal that gives your product every advantage. No spoiled batches from stains, or paper stock damage caused by corrosion. ARMCO Stainless is strong and highly resistant to chemicals used in pulp and paper production. It assures longer equipment life and reduced maintenance costs. Expertly applied to your individual requirements, it will help you produce a better product at less cost. A sure way to increase profits.

ARMCO Stainless Steel can easily be fabricated into many difficult shapes. It can be welded, soldered, riveted, formed, punched, sheared and drawn. When necessary, ARMCO Stainless equipment can be moved to new locations easily and economically. Ask us to help you apply the right grade for your requirements. The American Rolling Mill Co., 2201 Curtis Street, Middletown, Ohio.

ARMCO STAINLESS STEELS

WHERE TO USE ARMCO STAINLESS — *Blow pits, digesters, distributing tanks, Jorden bars, save-all trays, screen plates, evaporator linings, bleaching equipment, stuff chests and head boxes. These are only a few of the possible uses.*

THE PAPER INDUSTRY and PAPER WORLD

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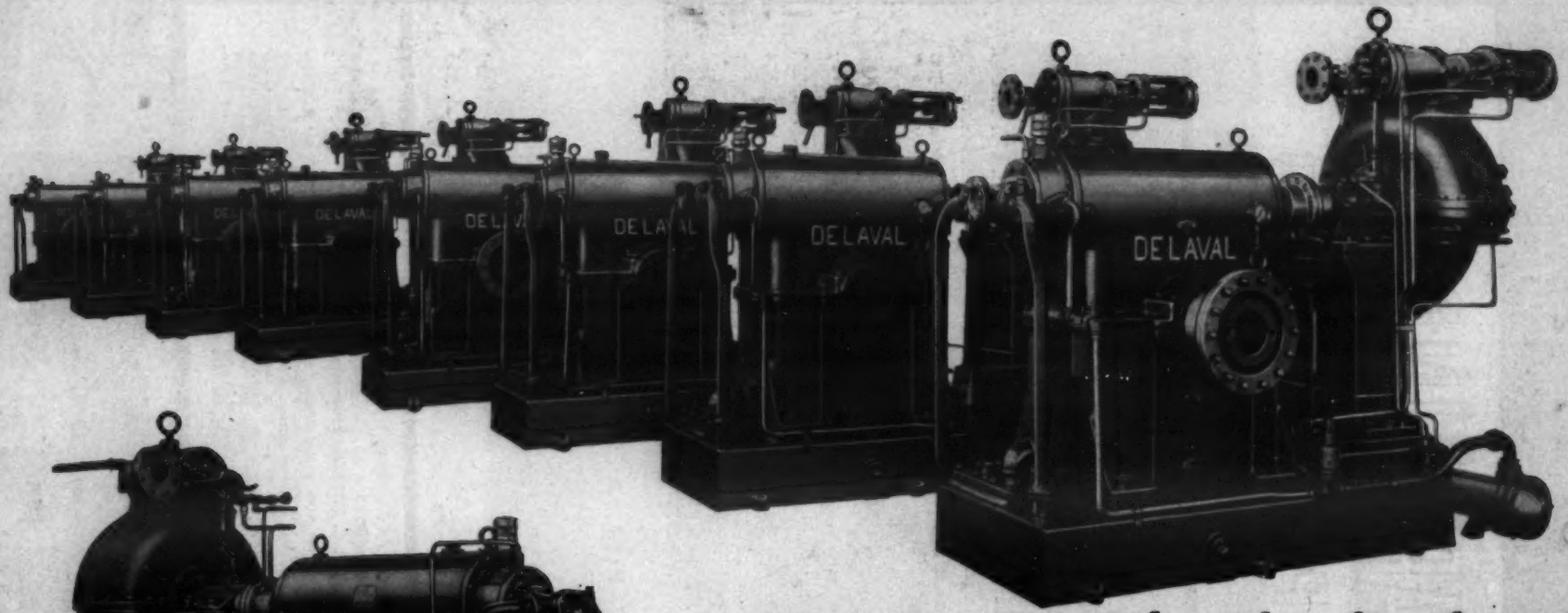

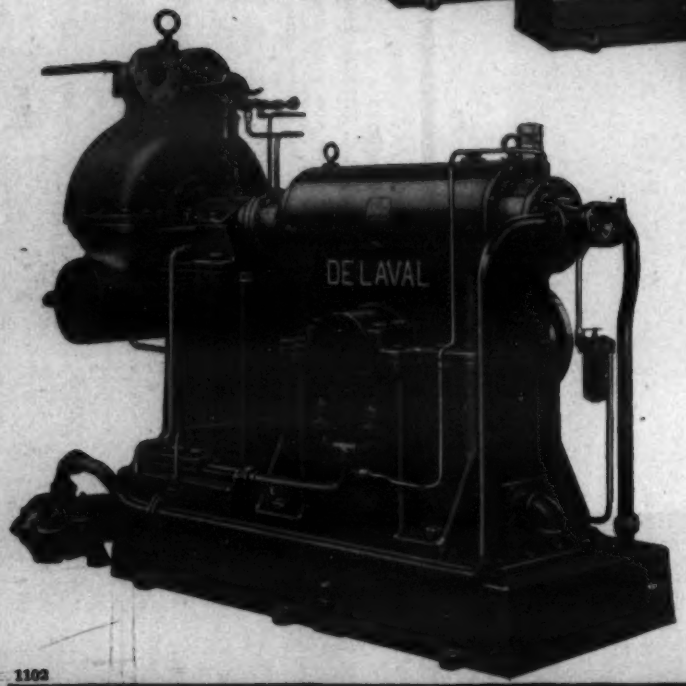

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DE LAVAL WORM GEARS

The eight induced draft fan drive units shown in the photograph are rated at 185 h.p. each at 3760 r.p.m. turbine speed. The De Laval velocity stage turbines receive steam at 250 lb. gage and exhaust against 10 lb. back pressure. A De Laval-IMO oil pump, mounted on the end of the worm shaft, forces cooled lubricating oil to the worm and worm wheel and to all bearings. A hydraulic governor controls the speed and there is also an independent over-speed trip-out.

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Our engineers will, upon request, supply data and suggestions which will enable you to select worm gear units, complete with bearings and casings, suitable for your particular requirements, or to incorporate worm and wormwheel transmissions in machines of your own design.

1102

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Into the Huyck warehouses from the ends of the earth come great bags of wool, selected fleeces of just certain types and qualities. Here the sorting begins. For only selected portions of each fleece are good enough for Kenwood felts, and these portions must be sorted and blended to meet each individual felt's exacting specifications.

In the sorting room at the Kenwood Mills, fleeces are broken down by the skilled fingers of a group of craftsmen with 362 years of combined experience. One man has been sorting wool for 35 years, two for 29 years, another for 21 years. The average experience of all Kenwood wool sorters is 17 years.

Such craftsmanship is typical of the skill that enters into the many steps in the making of Kenwood felts. This traditional craftsmanship in every operation has made Kenwood the largest manufacturer of papermaker's felts in the world. It is ceaselessly applied in making better felts for you.

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AMERICAN PULP & PAPER MILL SUPERINTENDENTS ASSOCIATION CONVENTION

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JUNE 22·23·24

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It's a history we draw upon every day in interpreting the plans of engineers. And it provides the right answer to a million questions involved in transforming blue prints into correctly-engineered sub-assemblies, easily welded together in the field. This specialized piping experience has been found invaluable by the engineers who say "Give the plans to Grinnell." Grinnell Company, Inc., Executive Offices, Providence, R. I. Branch offices in principal cities.

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Calender stack bearings run cooler . . . by many degrees . . . when lubricated with the proper grade Texaco Ursa Oils.

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For *Circulating* SYSTEMS..

OIL CIRCULATING SYSTEMS protect bearings from accumulating non-lubricating matter by washing it away as the oil passes through. Such bearings get even greater protection than this . . . if the oil is Texaco Ursa.

Texaco Ursa Oils are freed from gum or sludge-forming elements. They withstand the heat of high pressure and comparatively slow speed, maintaining the bearings in excellent condition.

Trained lubrication engineers are always available for consultation on the selection and application of Texaco Lubricants for paper mills. Prompt deliveries assured through 2108 warehouse plants throughout the United States.

The Texas Company,
135 East 42nd St., N. Y. C.

40-page Paper Mill booklet for the practical pulp and paper mill operator. Treats lubrication problems throughout the entire process. Send for a FREE copy.

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FOR CIRCULATING SYSTEMS

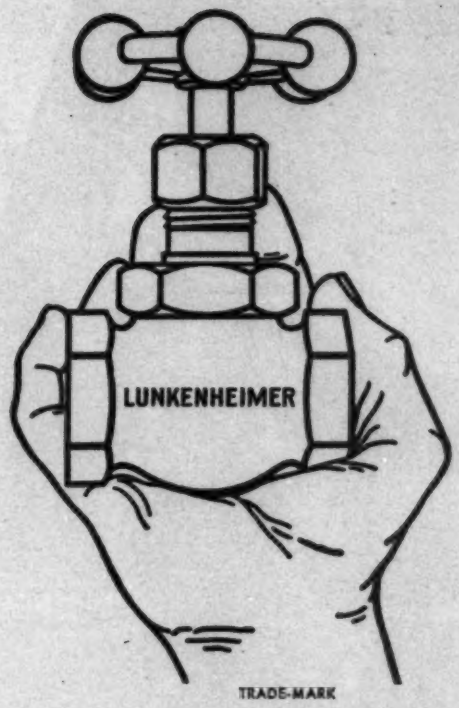
Why APPLETON FELTS

SERVICE *Quality*

FINISH *Uniformity*

DESIGN *Dependability*

APPLETON WOOLEN MILLS, APPLETON, WIS.



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"QUALITY"

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Jaeger looms

TRADE WINDS

BREAK GROUND IN JULY FOR LUFKIN NEWSPRINT PLANT

ON July 15 ground will be broken for a $7,500,000 four-unit newsprint mill at Lufkin, Texas, which may be the forerunner of an influx of newsprint mills in the South.

The new plant will be operated by Southland Mills, Inc., and will be constructed under the direction of George F. Hardy, engineer. Each of the four units will have an annual capacity of 50,000 tons. It is expected that the first production will come off the plant in about nine months.

Concluding financial arrangements for the new enterprise were made at a series of conferences held in connection with a three-day meeting of the Southern Newspaper Publishers' Association at Edgewater Park, Mississippi, May 30 to June 1. Texas publishers subscribed $270,000 toward the erection of the plant and a number of publishers of other Southern states also contracted to lend financial aid. The announcement of the mill's erection was made by James G. Stahlman, publisher of the *Nashville Banner* and chairman of the newsprint manufacturing committee of the S.N.P.A. Mr. Stahlman's committee has approved plans of engineers for the plant and financial structure of the mill, members of the association were told at the recent convention.

Following the announcement of the awarding of the $7,500,000 contract, Mr. Stahlman predicted that the new industry would be a repetition of the movement of the textile industry to the South and that following the newsprint mills would come rayon and chemical plants and other allied industries. Surveys have already been made looking toward the advisability of establishing newsprint plants in other Southern states, including Mississippi, Alabama, Florida, Georgia and Louisiana but no definite action has as yet been taken, Mr. Stahlman said.

"I have talked many times what I have thought of the possibilities of Southern newsprint," said Mr. Stahlman, "and Dr. Charles F. Herty, founder of the Herty Foundation Laboratory at Savannah, Ga., has preached it day in and day out. I am more sold on Southern newsprint today than I have ever been. I honestly believe that the minute this first unit at Lufkin, Texas, commercially produces newsprint for use on the presses of Texas publishers, you will see an influx of newsprint mills into the South and you will see within the next ten or fifteen years such an industrial, economic and social rehabilitation as you never have dreamed."

Equally optimistic was Dr. Herty, who told the publishers:

"What you are doing is something the South is always going to be grateful for, because the only argument left in the whole newsprint situation by the most bitter antagonists of the movement, is the fact that there has never been a commercial mill to produce it.

"Within a year the answer will be given and I know and speak with absolute confidence that with the success of that mill there is going to come a new period of industrial activity in the South such as the recent movement in behalf of the kraft mills. . . . I look forward to seeing within a very few years newsprint mills distributed likewise throughout the South from Virginia to Texas, which will bring prosperity such as I now see every day in Savannah."

Actual construction of the first newsprint mill at Lufkin comes after a long fight for the development of a native newsprint industry in the South. Publishers attending the convention in Mississippi saw it as a triumph for Dr. Herty and the leaders of the Southern Newspaper Publishers' Association. Even before announcement of the plans had been made, a total of 865,000 tons of newsprint already had been sold to Southern publishers.

AT WORK ON NORTHERN'S POWER PLANT

With the pouring of the deep concrete footings for the heavy dual boilers and generating machinery, the construction work on the big, new 6,600 hp. steam power plant of Northern Paper Mills, Green Bay, Wisconsin, was officially begun during the middle of May by the Baker Construction Company of that city. The building permit for the general contract amounted to $750,000.

Plans call for an almost square structure, 98½ ft. by 94½ ft., of face brick construction with white natural stone trim harmonizing with the appearance of the main mill buildings which the power plant will adjoin on the south. The building will be 55 feet high at its highest point and the entire plant will be dominated by a huge 18-foot diameter smokestack rising 234 feet in the air.

Various sub-contracts have already been let. The smokestack job will go to the General Concrete Construction Company of Chicago; General Electric will furnish one 3,000 kilowatt and one 2,000 kilowatt turbo-generator; the Riley-Stoker Corporation of Worcester, Mass., will furnish the high pressure boilers; the Buffalo Forge Company will supply the draft fans and the Worthington Pump and Machinery Corporation will supply special high-pressure feed water pumps. The automatic feed controls for the powdered coal, feed water and draft will be furnished by the Republic Flow Meter Company; the high pressure feed water heaters will be supplied by the Alco Products Company, New York; the de-aerating feed water heaters will come from the Hoppes Manufacturing Company and the hydrogen zeolite feed water treatment to prevent scale formation will be furnished by the Permutit Company. One of the boilers will be fitted with a Hofft furnace to burn bark and wood waste.

It is hoped to have the building proper well along towards completion by July 1. Machinery will then be installed and mill officials state that the plant will be operating by the first of the year, providing there are no unforseen difficulties during the construction period.

Davidson River as seen from the east section of Ecusta property looking toward Pisgah National Forest, watershed for the River.

Courtesy The Transylvania Times, Brevard, N. C.

View of plant site taken from near the boundary line of Ecusta property looking southeast. Village of Pisgah may be seen with Blue Ridge Mountain Range beyond.

Cigarette Mill for South

RICH in the heritage of early colonial enterprise and closely associated in many ways with the early beginnings of the United States, the city of Asheville, N. C., will soon become the scene of a new industry with the establishment of a new French cigarette paper mill to be erected near the historic Southern city.

The new plant, scheduled to be in operation by the early part of 1939, is being built by the Ecusta Paper Corporation, of Delaware and New York, which firm is closely allied with interests connected with the Papeteries Rene Bollore of Odet and Cascadec, France, and Papeteries de Champagne of Troyes, France. According to a statement from the Ecusta concern, the purpose of the new American plant will be to produce paper of the same high standard as the French mills with the added factor that it is expected to use American produced raw materials so that the finished product will be an American product from end to end. Flax will be used as the raw material by the new mill, the equipment of which will consist of four cigarette paper machines representing an investment of about $2,000,000 when installed. Engineers of J. E. Sirrine and Company of Greenville, S. C., are now at the plant site engaged in making surveys.

The actual location of the new plant will be in Brevard township, Transylvania county; a spot locally famous for its Indian mound which was erected by the Cherokee Indians many years ago in appreciation of the goodness of the god of harvest. The site is near the Pisgah National Forest and the waterpower will be derived from the Davidson River, whose watershed is entirely within the public land. The Memorial Arch Gateway to Pisgah Forest, inscribed with the names of Transylvania men who lost their lives in the World War, is one of the interesting sights in the immediate vicinity of the mill's 200-acre holdings.

Of the utmost importance is the fact that the Davidson River, which flows through property now owned by the corporation, is better than 99 per cent pure. Due to protection of the Federal Government, the plant's water supply for manufacturing and for use of employees will always be pure and fresh. Another assurance of the stream's continued purity is the fact that the corporation owns both sides of the stream from the edge of the national forest to where it empties into the French Broad River. The water will be taken at the edge of the Pisgah National Forest and piped into the plant to be located nearly one-half mile away. Rights to divert and use the water have been secured from the property holders along the river after it passes the corporation's own holdings, giving the plant full right to use such water as it may need for manufacturing or for other purposes.

An interesting account of the degree of co-operation afforded Ecusta officials by the local residents was revealed recently in *The Asheville Citizen*. According to the report, members of the old Davidson River Presbyterian Church, in order to facilitate the company's endeavor to secure water rights, held a special meeting and voted to

donate the diversion and all riparian rights to the corporation. This church, which traces its existence back to 1800, was recently visited by Harry S. Strauss, president of the Ecusta Paper Corporation, who wanted to see the church that had been so generous in its offering.

While the primary interest of Transylvania County citizens is in the fact that employment will be provided for a large number of persons, the possibility that this section may be able to provide part of the raw material to be used in the manufacture of fine paper, is also of interest. Brevard, a typical mountain community, has a population of 2,339 and its other industries consist of a tannery and a small cotton mill.

Both of the French companies connected with the North Carolina enterprise are leaders in their field and have been making cigarette papers for over a hundred years. Through the combination the Ecusta firm has at its disposal, not only the well established formulae of fine French cigarette paper, but in addition it will be benefited by the experienced aid of French technicians who will be in a position to add American ingenuity, skill and production methods to the experience of French cigarette paper manufacturers. When the mill is in operation it will give employment to between 300 and 400 persons who will be employed locally.

◆

FIRE RAVAGES OLD AWP MILL

Fire of undetermined origin destroyed the old No. 1 mill of the American Writing Paper Company's Riverside division in Holyoke, Mass., on May 17, causing damage estimated at $150,000. The property was acquired a few years ago from AWP by Zeloid Products, Inc., and in recent years had been sublet to a number of small concerns.

The fire broke out about noon and for a while it threatened the manufacturing district of Holyoke, where a number of paper mills are located. One of the heaviest losers in the fire was the firm of Downing & Downing, paper suppliers, who are located in a building adjoining the destroyed property. Stock estimated at $10,000 was destroyed. The Eastern Container Company, located in the same building, reported a $2,000 loss. The firms which were located in the mill proper were completely burned out, Zeloid Products, Inc., suffering losses of about $40,000.

FINANCIAL

THERE are surface indications that the bottom of the present depression has been reached as far as the paper industry is concerned, barring unexpected political developments before the adjournment of Congress early in June.

There is a paucity of orders for business, but despite this fact, mill operating reports show a slight—very slight—tendency upward. It is increasingly evident that the stocks on hand which had been excessively large at the beginning of the year are being so depleted that they must be replaced, thus accounting for a slightly larger volume of business for consumption reaching the mills.

Meanwhile, however, the serious effects of the depression are shown in the financial reports of the mills for the first months of the current year, and in the deferring of dividend payments by companies which had hoped to be able to pay returns to shareholders without further omission for some years to come. Among the companies which have deferred dividend action are: Eddy Paper Corporation, which has not voted for the second quarter the 20 cents per share disbursed for the first quarter; Soundview Pulp Company, which has paid 25 cents per common share. Nashua Gummed and Coated Paper Company cut its payment from $1 to 50 cents.

Financial reports to the Securities and Exchange Commission and to State authorities continue to show earnings far below those of 1937. Such reports include those of Nashua Gummed and Coated Paper Company, United Paperboard Company, Oxford Paper Company, all for the March quarter.

Complete reports for 1937 by several companies show an increase in income for that year compared with 1936, such reports not hitherto filed, including those of the Strathmore Paper Company, Advance Bag and Paper Company, and Eastern Manufacturing Company, now operating under Sec. 77-B of the bankruptcy act, shows a gain in net assets at the end of March as compared with the end of December.

The prevailing sentiment, however, seems to be that the worst is over.

Paper securities have felt the general drop in the stock market and many securities had nearly reached their low points for the year with the end of May. However, the activity on the stock market is so entirely lacking that such prices as are quoted are in many quarters thought to be a poor indication of public sentiment.

New York Stock Exchange—Stocks

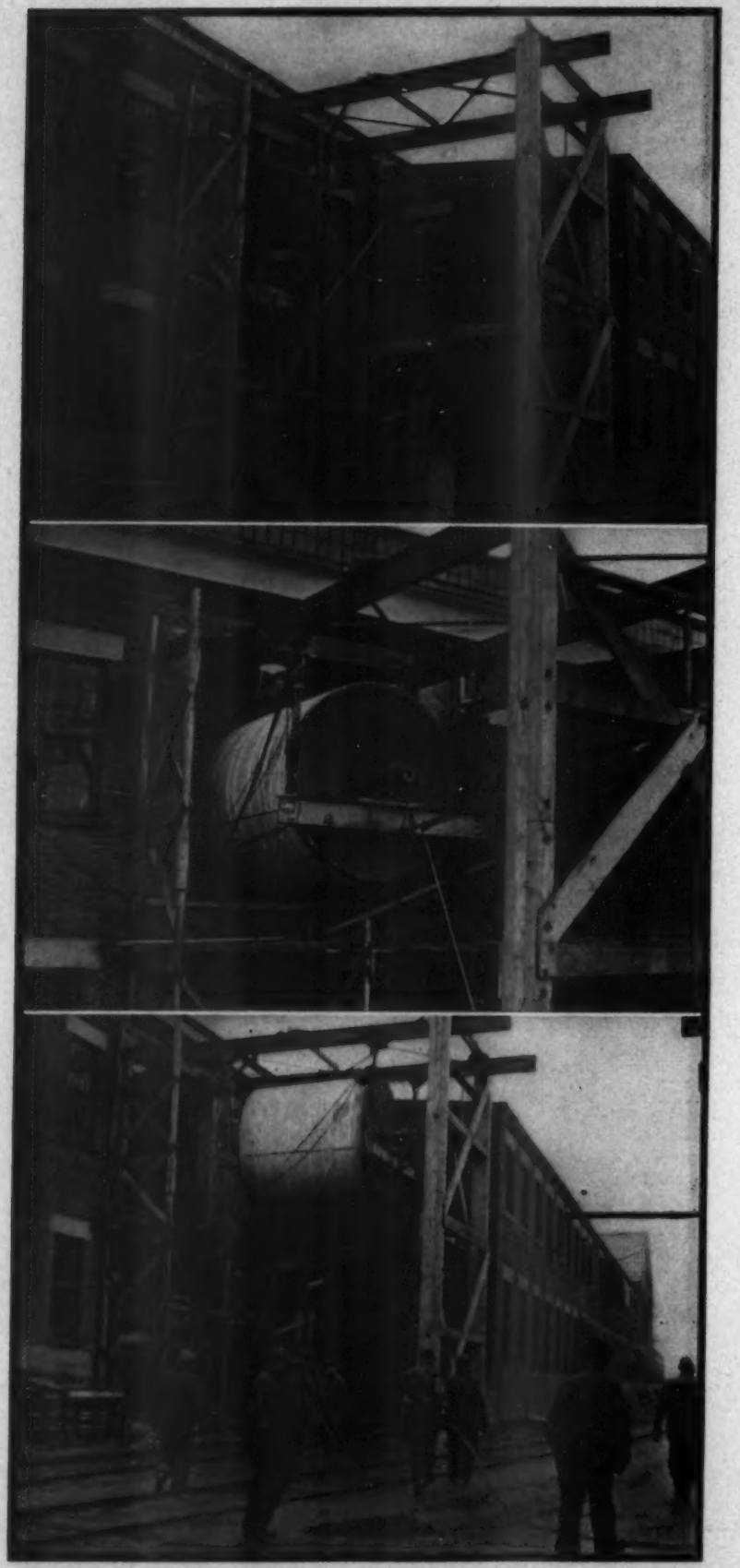
	1938 Closing Sale March 31	1938 Closing Sale May 7
Celotex	15½	19
Certain-teed Products	5⅜	7
Same Preferred	21	26½
Champion P. & F. Co., Preferred	95¾	98
Container Corp.	10	11⅜
Cont-Diamond	6¼	7
Dixie-Vortex	13⅛	14
Robert Gair	3	3½
Inter. P. & P.	6¼	7¼
Same Preferred	24⅝	28¼
Masonite	27¾	30¼
Rayonier	9	10
Scott Paper	39¾	40½
Sutherland Paper	21½	23
Union Bag & Paper	8½	10¼
U. S. Gypsum	63	73½

New York Stock Exchange—Bonds

Certain-teed 5½%	55	60½
Inter. P. & P. 6%	80	80½

New York Curb Exchange—Stocks

National Container	6	6⅛
St. Regis	2⅝	3⅛



NEW DRYER AT MARATHON PLANT

During the last two weeks in May a new 133-inch face dryer which has a twelve-foot diameter was installed in the Yankee paper machine at the Rothschild Division of the Marathon Paper Mills Company. This change necessitated changing the dryer drive ratio, moving and partial remodeling of the entire dry end of the machine,

Above—View of structure and hole in the wall necessary to remove old dryer and install new one.

Center—Old dryer coming out.

Below—Ready to lower old dryer.

partial removal of the brick wall of the machine room, and erection of scaffolding to support the pulleys, cables and dryer itself.

On June 1 the machine was again put in operation, and, according to R. H. Kelly, superintendent, thirteen minutes after the start-up salable paper was being wound on the reel. The change resulted in increased drying facilities, and a consequent better grade of paper.

The entire job was planned by the Engineering Department, with the co-operation of the paper department, and the actual work was done by the construction crew of the company under the direction of Grover Keeth, chief engineer; Joe Wiener, master mechanic; and August Doepke, foreman.

◆

GOVERNMENT ORDERS FOR MASS. FIRMS

Ten government contracts, calling for 1,297,000 pounds of paper, were awarded to the Whiting Paper Company, Holyoke, Mass., and six contracts calling for 100,000 envelopes were awarded the U. S. Envelope Company of Springfield, Mass., it was announced recently by the Joint Committee on Printing of Congress.

Contracts awarded the Whiting Paper Company included 720,000 pounds of 50 per cent rag white bond paper, 30,000 pounds of 50 per cent rag lithograph-finish map papers, 12,000 pounds 100 per cent rag white bond paper, 3,000 pounds 100 per cent rag declaration bond paper and 2,500 pounds of 75 per cent rag white bond paper. The award to the U. S. Envelope Company embraced 70,000 light colored brown kraft shade envelopes and 30,000 sulphite writing envelopes, white and colored.

The committee took the unusual course of rejecting all tie bids received.

First Commercial De-Inking Plant Now Operating

The Silco Pulp Products Company announces that their de-inking process invented by Dr. F. W. Hochstetter, Pittsburgh Scientist, is now in full operation in the first commercial de-inking plant of the

O. B. ANDREWS COMPANY
CHATTANOOGA, TENNESSEE

After several months of extensive tests wherein all grades of waste paper including BOOKS, COLORED LEDGERS, BLUE PRINT PAPER, WAX PAPER, NEWSPAPER, PRINT MANILAS, MIXED PAPER AND FLY LEAF SHAVINGS as well as other grades were successfully and economically de-inked, the process was officially accepted by the O. B. Andrews Company and is now under their operation.

It is the intention of The Silco Pulp Products Company to license a limited number of paper mills in various zones under this process.

Paper mills interested in securing detail information, please communicate with—

Mr. E. H. Silberman, President

THE SILCO PULP PRODUCTS COMPANY

1836 Euclid Avenue — Cleveland, Ohio

These totaled a dozen paper bids and one envelope bid. The latter, rejected because duplicate bids were offered on it, was for the large item of 9,000,000 envelopes. Paper bids rejected because of tie bids, involved several fair-sized contracts including one for 400,000 pounds of machine-finish book paper.

◆

CULLEN CONFIRMS SALE TO BOWATER'S

Confirming rumors to the effect that a deal between the International Power & Paper Company of Newfoundland, Ltd., and Bowater's Paper Mills, Ltd., of London, was impending, announcement was made Thursday, June 2, that all of the common share capital of the International company had been sold to the English firm for a consideration not yet announced. It had been admitted that negotiations were in progress but until this announcement by R. J. Cullen, president of International company, the transaction was in its preliminary stages. The capital of International's Newfoundland properties is £500,000 par value but it is believed that the actual price paid was materially in excess of this figure.

The negotiations had centered about the conferences between Bowater's and the provincial government over the securing of timber rights to warrant a large expansion in pulp producing capacity. It is understood that the purchase of the International property was contingent upon securing additional timber rights. With the purchase of the International properties, Bowater's becomes the world's greatest producer of newsprint, displacing International which had held first place. The purchase gives Bowater's newsprint capacity of over 600 tons per day and over 7,000 acres of timberland to which International held title or cutting rights.

◆

ANTICOSTI DEAL AGAIN REVIVED

Principal development at the annual general meeting of shareholders of Consolidated Paper Corporation, held recently in Montreal, was President L. J. Belnap's reference to the proposed sale of the company's Anticosti Island property (cf. *Paper World*, p. 18, May 1938), to Dutch financial interests who, Mr. Belnap said, are prepared to spend some $14,000,000 in its development. Mr. Belnap asserted that the sale would not only be advantageous to the shareholders who would be relieved of annual carrying charges on the property, but would be of distinct public benefit because of the employment which would be provided. It was pointed out that the object of the purchaser in acquiring the island would be for the cutting and exporting of wood under existing laws and that the island would be owned by a Canadian company.

Meanwhile the Canadian Parliament was given assurance by Premier Mackenzie King that the interests of Canada were being fully safeguarded in present negotiations for the Island's purchase. Recently Anticosti was surveyed by a group of German technicians who were thought to have received the option on the property.

◆

BECKETT PAPER CO. IN NEW QUARTERS

The Beckett Paper Company, Hamilton, Ohio, is celebrating its 90th anniversary by completion of a new office and manufacturing building.

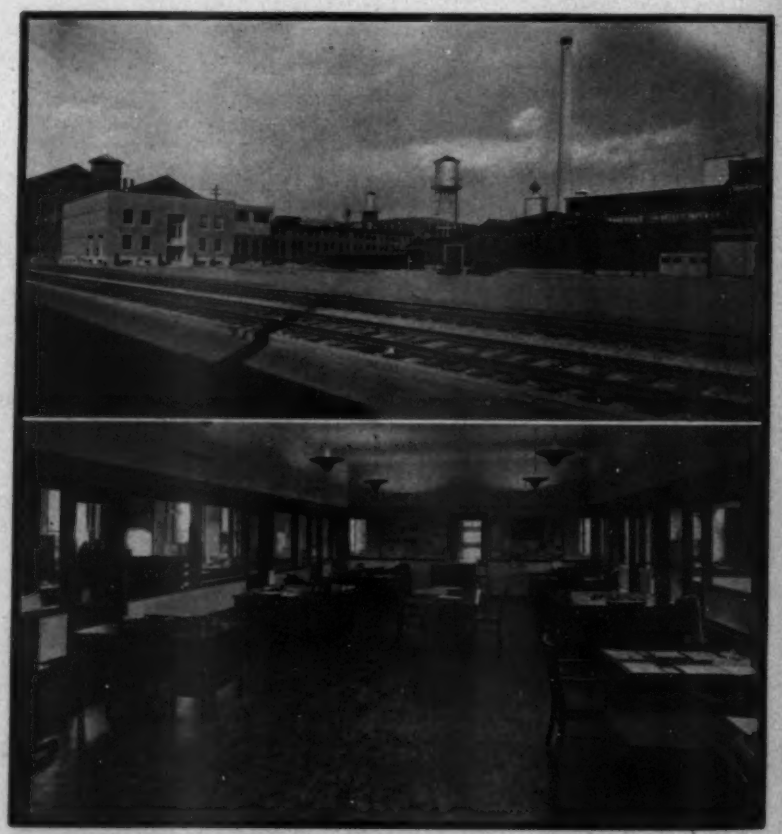
The building is two stories high and the office is of modern design, one interesting feature being the two large displays showing a wide variety of printing and lithographed samples of the company's products. The office is air-conditioned and contains six divisions made up of the general accounting, shipping, stenographic and order departments and the directors and consultation room.

The west side of the new structure is accessible to the Baltimore and Ohio tracks and the east side is constructed for shipping purposes with ample room for three trucks to be loaded simultaneously. The basement is of fireproof construction and the grounds surrounding the building are being landscaped with shrubs and plants.

This is the third major improvement in five years for the company. In 1936 a complete modern steam plant was erected and three years previous the company rebuilt the paper machines. The Beckett company manufactures covers, offsets, texts, greeting and announcements, writings and bonds.

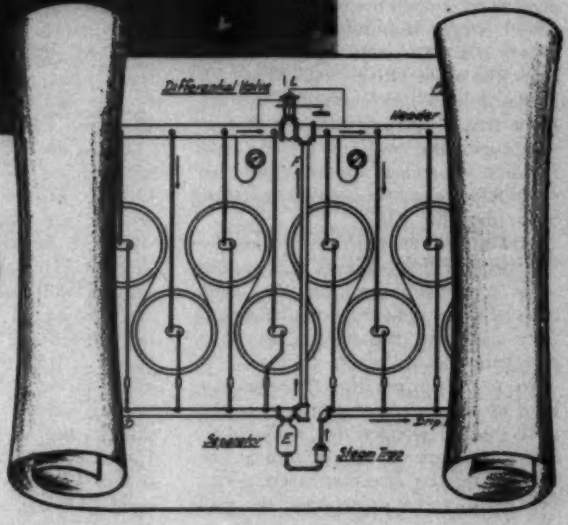
◆

▶▶▶ THE DANISH FREIGHTER LOUISIANA arrived at Baie Comeau, on the lower St. Lawrence recently, the first ship to carry newsprint from the Ontario Paper Company's new mill.



Above—Beckett Paper Company's new office building (at left).
Below—Interior view of new offices.

A view from the back side of the dry end of a paper machine equipped with the Armstrong Drainage System.



THE ARMSTRONG PAPER MACHINE DRAINAGE SYSTEM

1. **PROVED PERFORMANCE.** Eliminates the troubles attendant to faulty drainage.

2. **SIMPLE DESIGN—POSITIVE OPERATION.** Easy to regulate and highly flexible.

3. **CONSERVES STEAM.** Top notch performance with no sacrifice in efficiency.

4. **REASONABLY PRICED.** A minimum of new equipment is required for most conversions.

WRITE:

● If you have been contemplating modernizing your paper machine drainage system, don't fail to investigate the Armstrong System. We will be glad to send you the explanatory chart so you can see for yourself how the system works. Write for a copy. No obligation.

ARMSTRONG MACHINE WORKS

854 Maple St., Three Rivers, Mich.

This photograph of the Brokaw dam was taken a few hours after the power house had been washed away.

WAUSAU MILL TO RE-OPEN

DIRECTORS of the Wausau Paper Mills Company, Brokaw, Wisconsin, held a meeting in Wausau, June 8, and decided to re-open the plant which was closed when the company's hydro-electric plant and dam were swept into the Wisconsin River on May 28. Although economic conditions did not favor the re-opening of the plant at this time, the welfare of the 300 families dependent on the mill for support was one of the deciding factors in the decision.

Power will be purchased from the Wisconsin Public Service Corporation until a definite decision has been reached as to reconstruction of the concrete dam and the installation of a new hydroelectric plant.

In order to get the fourteen-foot head of water necessary to operate the mill, the old wooden dam will be rebuilt. Repairs on this started a few hours after the directors meeting had been held, and it is expected the mill will be in operation by June 20. Money for this reconstruction was raised from some of the stockholders and also through the company's banking connections.

During the shut-down period, current orders have been taken care of by the Rothschild Division of The Marathon Paper Mills Company.

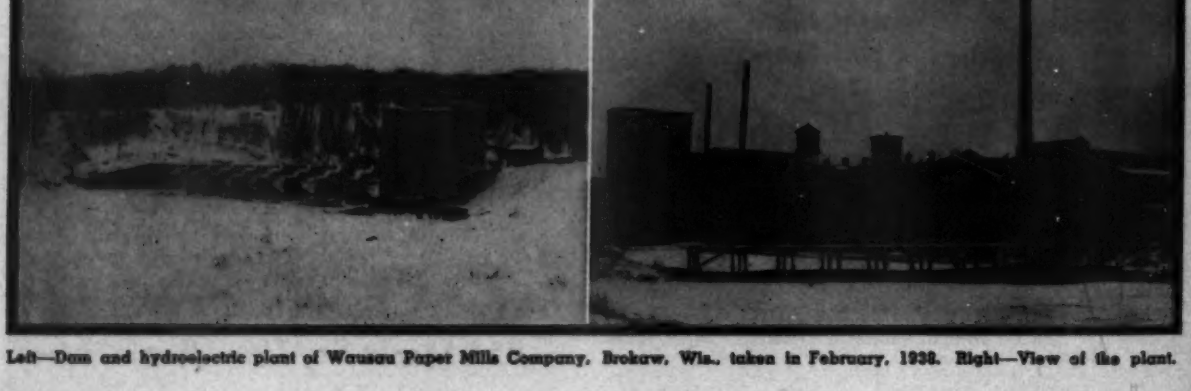
It has not yet been determined just what caused the collapse of the dam. Donald Hammond, night engineer, was on the dam making his rounds when he heard what seemed to be thunder. He saw a seam open in the ground northeast of the plant, and an opening in the dam itself. He ran toward the shore and reached it barely in time to save his life. Hammond threw a switch in the mill connecting outside power and then telephoned the Wisconsin Public Service Corporation at Wausau to warn them that a 19½ foot head of water had been let loose. They in turn warned the mills down the Wisconsin River Valley.

Construction of the dam was started in 1923 and completed the following year. The hydroelectric plant was started in 1925 and put into operation the next year. The building, approximately 60 feet in height, stood on the east end of the 325 foot concrete dam located about 300 yards west of the mill. Thorough inspection of the catastrophe in daylight showed that there were no traces whatever of the hydroelectric building, the turbines, generators, or the dam hoist. All had disappeared in the 70 to 80-foot hole directly below the dam.

The hydroelectric plant was of modern design and completely automatic. It was equipped with a 1420-horsepower wheel and a 1100 kw.-hr. turbine. Last fall a diver inspected the foundation and reported it to be sound. Repairs were made on the gates at that time. Estimates of the damage have been placed at half a million dollars. L. E. DeGuerre, consulting engineer, has been retained to make a complete survey of the damage caused and to estimate the probable cost of rebuilding.

The Wausau Paper Mills has pursued a consistent program of efficiency. Since 1935 when a new management assumed charge of operations, tremendous strides have been made in renovating buildings and machinery and in installing new equipment. The plant formerly manufactured kraft target papers and similar coarse wrapping grades, but numerous changes have been made in equipment, processes and personnel to permit the manufacture at present of the finer grades of paper such as bonds, offset and lithograph papers.

During the early part of this year a new Fibre Making Processes digester circulation system was put in operation. Also a complete slushing system was installed to slush pulp from the sul-



Left—Dam and hydroelectric plant of Wausau Paper Mills Company, Brokaw, Wis., taken in February, 1938. Right—View of the plant.

phite mill to the paper mill. A complete revision of the screen room was made consisting of the rebuilding of 18 Appleton and Packard screens. A Nekoosa thickener was installed; an old Brown stock chest was rebuilt; a 6x8 Oliver United washer and a new set of conveyors were installed. Bleacher dump chests and decker chests were streamlined, new pumping equipment and galvanized steel spiral pipe was installed. At the same time a complete revision of the white water system was made including the installation of new pumping and piping equipment.

In the fall of 1937, two old acid towers were torn down and new ones built with steel supporting framework. An experiment was conducted with acid-resisting varnish for the outside of the tanks, which proved to be very successful. In this same connection, a new acid storage tank is being erected at present.

During 1937, when the slushing system installation was being started, it was necessary to move the boiler feed pumps from the pump room in the bleach plant building adjacent the new boiler house because the pump room was to be used for the slushing system pumps. The new room, 17 feet by 22 feet, was constructed of brick and steel. Two centrifugal and one steam pump were installed in this building.

◆

FRANCHISE TO BOWATER-LLOYD

The Bowater-Lloyd Company, Ltd., of London, will install a huge new machine to manufacture the coated book paper on which the Consolidated Water Power and Paper Company of Wisconsin Rapids, Wis., now holds the patent, according to Edgar L. Fifoot, sales director of the European concern. The machine will be similar to the new 75-ton machine recently put into operation by Consolidated at its Wisconsin Rapids division.

Mr. Fifoot and family were guests of George W. Mead, president of Consolidated, for a considerable period this spring while Mr. Fifoot studied the revolutionary method of making coated book paper in rolls, a method which has solved production problems for *Life* magazine and other picture publications.

The English company has no machine built especially to use the process, its coated paper being turned out on machines changed over to use the process. Some 50 English publications are now printing on this paper supplied by Bowater-Lloyd, with acceptance by the trade "very satisfactory," according to Mr. Fifoot, who says his company expects a steadily expanding market for the product.

Constant interchange of ideas makes available to the industry methods used on either side of the Atlantic and technical differences between the paper industry in America and England are slight, the English sales head explained. His company, in its Kelmsley mill, operates the largest newsprint mill in the world, capable of producing a 310-inch sheet amounting to 350,000 tons of newsprint a year.

The Bowater-Lloyd concern, a comparatively recent amalgamation of two large English companies, operates five mills in England. Mr. Mead made several trips there to complete arrangements for the English franchise on new paper developed in the Consolidated mill. Mr. Fifoot was greatly impressed with the new Consolidated machine, stating that the "industry in Europe had nothing to compare with it."

◆

FIRST BOATS REACH GREEN BAY

The 1938 shipping season for northern Wisconsin mills opened with a rush during mid-May with the arrival at Green Bay, Wisconsin, of three vessels carrying foreign pulp and pulpwood.

The steamer Sarniadoc of Patterson Steamships, Ltd., Fort William, Ontario, was the first ship into port with 7,625 bales of Swedish pulp weighing 1,596 tons. Following it, a day later, the steamer Inca of Northern Paper mills docked with the first cargo of Canadian spruce. It carried 923 cords on the first trip and returned immediately to Michipicoten Harbor, Ontario, where it will load for the mill all summer. Two days later, Hoberg Paper Mills, Inc., at Green Bay and Kimberly-Clark Corporation at Kimberly, received 2,000 cords of spruce from the Pigeon Timber Company of Fort William. This wood was brought in by the Lakehead Transportation Company tug, Bon Voyage, and the 365-foot barge, Maureen H., from Slate Islands district at the extreme north shore of Lake Superior.

The steamer Inca has figured three times in the news lately by reason of its bringing in the first pulpwood and also because of its collision with a railroad bridge and the fact that its registry has been changed from the United States to Canada.

The ship, which had docked at the Northern's slip all winter, was departing for Michipicoten Harbor when a strong current carried it slightly off course and into the protection pier of a railroad bridge in the inner harbor, causing some $600 damage to the span. The vessel was not damaged, however, and continued its trip.

The Northern Mills also announced the changing of the Inca's registry to its subsidiary, Northern Paper Mills, Ltd., an Ontario corporation. The ship will ply all season between Michipicoten and Green Bay bringing in some 40,000 cords of wood for Northern.

The pulpwood receipts at Green Bay were the initial consignments of some 125,000 cords which will be brought to the port from Canadian points. This season is expected to top all previous ones in tonnage.

In Ashland, Wisconsin, pulpwood receipts are also expected to set a new record this year. About 125,000 cords will be received in rafts from northern Minnesota and Canada. Marathon Paper Mills Company expects between 50,000 and 60,000 cords while the Newaygo Tug Lines, Inc. will haul from 60,000 to 70,000 cords for Consolidated Water Power and Paper Company. Marathon will store its wood at Ashland, shipping it by rail as needed while Consolidated will re-ship by rail to its mills immediately after arrival by water.

◆

ENGINEER GIVES TESTIMONY FOR EAU PLEINE DAM

Testimony to the effect that the damming of the Little Eau Pleine River in central Wisconsin would create a flowage covering about 40,000 acres, was given by Tom Utegaard, engineer for the Consolidated Water Power & Paper Company, Wisconsin Rapids, Wisconsin, at a hearing in that city on May 31 by the State Public Service Commission on a petition of the town of Eau Pleine for authorization of a flood control project.

The Little Eau Pleine project is sought as the twenty-second and largest in the chain of reservoirs along the Wisconsin River operated by the Wisconsin Valley Improvement Company to control flowage of the river during periods of drought and high water (cf. *Paper World*, P. 5, July 1937).

The reservoir, Mr. Utegaard testified, would take approximately four feet off the river's crest at Nekoosa when the spring flow reached about 68,000 cubic feet per second, with similar decrease in the crest at other points. Paper mill operations would be affected materially, he said, with shutdowns caused by both high and low water eliminated to a large extent.

According to Mr. Utegaard, the flow of the river would be equalized between the low point of about 800 cubic feet per second and the crests of about 70,000 cubic feet. This would be "one way to carry out the plans" which the State Board of Health is now prosecuting in an effort to lessen river pollution, Mr. Utegaard testified. The Little Eau Pleine project will cost between $10,000,000 and $15,000,000.

◆

NEW POWER UNITS AT HOLYOKE MILLS

Although there has been a slowing down in the rate of new power plant installations in recent years, it is noticeable that the new projects in the past two years have involved a large percentage of paper and pulp mills.

A large share of the power output of the Holyoke Water Power Company, Holyoke, Mass., is consumed by the paper mills of that city; equipment to burn pulverized coal has also been installed to feed one new boiler at the Byron Weston Company, Dalton, Mass.; the New Haven Pulp and Board Company, New Haven, Conn., have just completed a new boiler to be fired with underfeed stokers, while the International Paper Company has installed additional boilers. In these and other installations, marked preference was shown for coal rather than competing fuels.

◆

BADGER PLANS FOR NEW DIGESTER

Badger Paper Mills, Inc., Peshtigo, Wis., recently started the construction of a building to house a new digester. Adjoining the pulp mill, the structure will be 46 by 46 feet, and will be four stories, or 106 feet in height. It will house a 14 foot digester which is 40 feet high. The general contractor is John Salen & Son, Menominee, Mich., while Vulcan Manufacturing Company, Fond du Lac, Wis., is in charge of the structural steel work. Willard Fahrenkrug, maintenance superintendent, is directing the progress.

◆

PROTEST SALE OF LOGS TO JAPAN

According to a report from the American Consul General at Vancouver, B. C., log exports from British Columbia to Japan in 1937 amounted to 27,628 board feet. Inasmuch as it has been reported that Japan is planning to use British Columbia logs in large new pulp manufacturing enterprises and that Japanese interests have acquired large tracts of standing timber in British Columbia, numerous protests have been made by private sources suggesting an export tax or an outright embargo on such exports.

The Provincial Government, however, takes the stand that it has no control over the export of logs from Crown-granted land, and the Minister of Lands has therefore announced that the question of controlling log exports will be discussed with Dominion Forestry officials.

◆

MOVE MEAD OFFICE

Business offices of the G. H. Mead Company of Chillicothe, Ohio, which have been located for a number of years in the Refiners' Building, 11 West Monument Avenue, have been moved to the new Talbott Realty Building at 131 North Ludlow Street. Since the death of Robert T. Houk, Sr., vice-president of the Mead Corporation, all offices of that firm are now in Chillicothe.

◆

SIZING SYSTEM PATENTED BY DR. ROWLAND

A new method in the starch sizing of paper has resulted in the issuance of a patent to Dr. Ben W. Rowland, research associate at the Institute of Paper Chemistry, Appleton, Wis. Jordan V. Bauer, of Chicago, was associated with Dr. Rowland in the design. The application was made in June, 1935, and is approved as to five points. Commercial rights have been assigned to a Chicago corporation.

It is reported that the addition of a tough starch dispersed in an alkaline solution is involved in the new method. The starch is precipitated upon the paper fiber through addition of an acid material.

◆

BIG EAU PLEINE DAM REPAIRED

Repairs to the riprapping of the Big Eau Pleine Reservoir dike, damaged this spring by excessively high waters, are now complete. For a time it was feared that considerable damage might be done to industries and communities downstream if part of the Wisconsin River dam should go out. Water in the reservoir is being kept near capacity to assure plenty of flowage for power purposes later in the summer when the river stage is expected to drop.

The Big Eau Pleine Reservoir, the largest basin for water storage along the Wisconsin River, is controlled by the Wisconsin Valley Improvement Company. Wisconsin valley paper mill men are stockholders in the concern.

◆

ANDREWS COMPANY BUILDS ADDITION

Construction of a new addition to the mill of the O. B. Andrews Company of Chattanooga, Tenn., was begun recently. The new building, a one-story structure 200 by 280 feet, will contain approximately 45,000 square feet of floor space and will be of fireproof construction. It is reported that the new addition will cost about $100,000 including equipment which is to be installed. The Silco Pulp Products Company, Cleveland, recently installed its first commercial de-inking unit in the Andrews plant and has reported very satisfactory results from the first operations.

◆

PUBLISHERS MAY WITHDRAW FROM CONTRACTS

The annual convention of the American Newsprint Publishers Association at New York heard a report of the newsprint committee, which devoted more attention than usual to the Canadian Government's attitude on newsprint prices.

The publishers indicated a tendency to withdraw from the contractual price arrangements and to buy where they can secure the best prices on shorter term contracts. A significant change in tendencies was indicated by the action of two metropolitan morning papers, the *Times* and the *Herald-Tribune*, the news stand prices of which have been increased from 2 to 3 cents.

◆

NEW KRAFT DIV. FOR H. & W. CO.

The Hollingsworth & Whitney Company recently reported the establishment of a new Belgrade Kraft Division which will manufacture competitive Belgrade Kraft paper, Multi-Wall sacks and gummed paper products, including gummed tape. Bag machines have been installed and slitters and other equipment for gummed tape production are nearly ready for operation. B. Milton Kimball, formerly of the Gilman Paper Company at Gilman, Vermont, and Roger Q. Pease of the same company have been added to the Hollingsworth & Whitney Company personnel as a result of the new development. (See "Personals.")

Again . . . research erects a milestone on paper highway

It is no accident that the new Black-Clawson light weight, non-corrosive Fourdrinier is another milestone on paper highway. Quite to the contrary, in fact, for here is another example of the great things accomplished by extensive research. We point out that the ceaseless efforts of Black-Clawson and Shartle Brothers in this direction have lead to many of the industry's outstanding developments...such as continuous beating, vertical dryers, and the B-C super wet-end. ● For the newest and most efficient paper mill machinery, turn to Black-Clawson and Shartle Bros.... always one step ahead.

BLACK-CLAWSON and SHARTLE BROS.

Green Bay trestle rammed by pulpwood boat

PULPWOOD BOAT RAMS TRESTLE

Damage estimated by railway officials at $10,000 was done to a railway trestle at Green Bay, Wisconsin, recently by the Canadian pulpwood barge, Merl H. when it struck the span as the tow line between it and the tug, Guardian snapped and the ship got out of control. In the accompanying photograph both vessels are seen in the background just after moving away from the bridge while road executives are in the foreground examining the damage. The barge had just unloaded some 2,000 cords of wood at Kimberly-Clark Company dock and was on its way back to Lake Superior for another load when the accident occurred. Neither ship was damaged and proceeded shortly after the crash. The vessels are operated by the Lakehead Transportation Company of Fort William, Ontario.

◆

LAKE SULPHITE DEVELOPMENTS

At a hearing held in Toronto, May 6, on appointment of a permanent liquidator for the Lake Sulphite Pulp Company, provisional liquidator D. McK. McClelland reported to the court that his investigation into the affairs of the company would be completed in the near future after which he would be in a position to consider several preliminary plans which had been put forward.

According to Hon. Peter Heenan, Minister of Lands and Forests in Ontario, plans for the rehabilitation of the Lake Sulphite Company, are now under consideration by a committee of shareholders, with every prospect that the enterprise, now in receivership, will be refinanced satisfactorily.

◆

NEPCO SAMPLE DEPARTMENT IN LARGER QUARTERS

As another step in the improvement and expansion program of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, the sample department of the Port Edwards mill has been moved to a new and larger location with complete and modern facilities for handling samples of many grades of fine paper manufactured in the mill.

The new department, ideally located at the east end of the finishing room, has 1,152 square feet of floor space. Several two-story windows with northern exposure supply abundant natural light for the inspection of paper and colors. Dustproof sample cases, containing more than 1,000 drawers, protect the files and sample supplies of all grades. Artificial lighting facilities supplement the natural light and are of the modern, shadowless type. Humidity conditions were also considered in selecting the new location.

The department handles an average monthly total of 325 sample requests with an average gross shipping weight of approximately 3,800 pounds. Before any papers leave the sample department, they must meet the approval of the manufacturing department and pass rigid laboratory examinations to verify standards set up by the Nepco plan of pre-tested and controlled manufacture.

◆

STATE APPROVES A LOAN FOR BROWN CO.

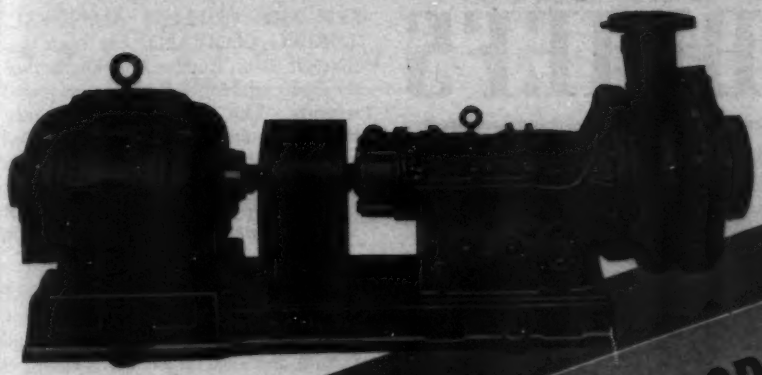
The City Council of Berlin, N. H., and the State of New Hampshire have formally approved a State loan of $2,500,000 to the Brown Company, Berlin, to enable the Company's logging program for the fall-winter season to be carried through without a hitch. The loan was made under a contract similar to those of the past two years, and provides for the purchase of not more than 250,000 cords of pulpwood by the Brown Company from the State. The work will provide employment for hundreds on relief. The contract includes specific provisions covering the hiring of foremen and employes as well as other details of the logging program. The company had previously petitioned the Federal District Court at Portland, Me., for permission to issue $2,500,000 of receivers' certificates, a request that has since been withdrawn.

◆

N. E. PULP MFRS. REDUCE PRICE

New England pulp manufacturers were quick to follow the announcement of a $5 per ton reduction in bleached and unbleached sulphite which had its origin on the West Coast according to eastern producers. The $4 per ton cut in the delivered price of bleached soda pulp followed a few days later with the explanation that the soda mills had absorbed the freight rate increase where the sulphite mills (selling ex-dock equivalent) had passed it on to the customers. Hence the soda makers felt justified in not going the full distance in the current cut. The new soda price is $54 delivered customers' mill, bleached sulphite $55, and unbleached sulphite $45, the two latter always quoted on an ex-dock equivalent. What surprised some members of the trade was the decision to make the new prices effective almost immediately, that is June 1, instead of waiting until the third quarter began on July 1.

The reason for this haste is given in some quarters as the resale situation on foreign sulphite which was very weak, and also, the commitments which some producers had privately made before the public announcement came out. Unbleached sulphite had



THIS PUMP MEETS SPECIAL PROBLEMS OF TEMPERATURE CORROSION *and* ABRASION

● Goulds Fig. 3605 is particularly suited to handle corrosive and abrasive liquors at all temperatures.

This pump has established an unmatched record for the handling of caustic cooking liquors and the recovery of the chemicals in soda and kraft mills economically—without costly shutdowns for repairs.

The satisfactory operation of scores of these pumps in severe service are producing new economies in paper mills throughout the world.

For more than half a century Goulds has been building pumps for every pumping service in the paper industry. There are Stock Pumps, Double-Suction and Fire Pumps, Single and Multi-Stage Centrifugals and other types, all available in a wide range of capacities.

Write for Bulletin No. 206 giving complete information on Goulds Pumps for Paper Mill Service.

GOULDS PUMPS Inc.

ATLANTA BOSTON CHICAGO HOUSTON NEW YORK PHILADELPHIA PITTSBURGH TULSA Representatives in all Principal Cities

8331

already sold down to $40 dock on very fair brands, resale, and inferior pulp had changed hands under $40.

A very few days after the sulphite price disclosures were public, came the confirmed report that southern kraft pulp has been contracted by northern converting mills on the basis of $37.50 per ton delivered, the lowest confirmed price recorded on a pulp of similar quality. Board mills in the northeast were among the buyers.

These developments were, it was hoped, the necessary adjustments to stabilize values. However certain eastern sulphite makers professed themselves as ready to meet any further competition. Meantime, resale foreign kraft pulp was offered at $40-$45 ex-dock north Atlantic ports. The news of the paper market that concluded this general recession, was not unexpected: cuts in kraft paper of $10 per ton to $70, kraft board at $50, with corrugated board at $46. Chip board has been sold at $26.50.

◆

ADVANCE BAG CO. ADDS FOURDRINIER

Advance Bag & Paper Company of Boston, with mills at Howland, Me., announce that a new 120-inch fourdrinier with a capacity of about 30 tons daily is under construction for the Southern Advance Bag & Paper Company in the plant of Pusey & Jones Corporation, Wilmington, Delaware. It is hoped to have the new equipment installed about the first of November. The Hodge, Louisiana, mill already is equipped with 158-inch and a 242-inch fourdriniers for the production of bag kraft. The new equipment will enable the company to produce specialty grades from their own sulphate pulp with greater economy and flexibility. New pulp capacity will be required.

◆

HAAS TO BUILD STRAWBOARD MILL IN NEWARK, OHIO

The new strawboard mill to be built by Charles Haas, formerly general superintendent of the Consolidated Paper Company's north side mill in Monroe, Mich., will be located in Newark, Ohio. Mr. Haas, who recently announced plans for the mill (cf. *Paper World*, P. 6, May 1938), has further stated that the plant is to be named the Newark Paper Company. According to reports, a $600,000 capitalization setup is to be made with $200,000 subscription in cash. The plant will have a capacity of from 80 to 100 tons of strawboard daily.

BRIEFS

▶▶▶ GREAT NORTHERN PAPER COMPANY has announced that its price for newsprint for the second half of 1938 will be the same as at present, $48 per ton, delivered, New York. Other companies which meet the Great Northern price are expected to make a similar announcement. The original announcement had been $48 for the first half of the year, and $50 for the second half.

◆

▶▶▶ THE ONTARIO PAPER COMPANY, Thorold, Ontario, will construct a pulpwood handling and barking plant, with power house, power line, wharf and housing for the staff, near Heron Bay, Ontario. Bids have been asked for the erection of the plant.

◆

▶▶▶ THE PROVINCIAL PAPER, LTD. has announced that the program of renovation work to the plant at Port Arthur, Ontario, which was decided upon last year, is being proceeded with. A new suction press has just been put in service and other equipment improvements are to be made later.

◆

▶▶▶ PROPERTY FORMERLY OWNED BY the Patten Paper Company, Ltd., Appleton, Wis., has been taken over by the Fox River Paper Company, Appleton, which acquired it at a recent sheriff's sale. Fox River does not contemplate operating the mill, but will use a portion of the space for storage. It will rent about 50,000 square feet of floor space to other industries.

◆

▶▶▶ THE BROWN COMPANY has awarded the Foundation Company of Canada a contract for the erection of a wood-barking plant at the former company's La Tuque, Quebec, pulp mill.

◆

▶▶▶ THE GREAT LAKES PAPER COMPANY'S claim against the Minnesota and Ontario Paper Company has been settled, according to President C. H. Carlisle of the former concern. The Great Lakes company now ranks as an ordinary creditor for $1,162,254. It was indicated that the settlement was mutually arrived at and was agreeable to all concerned.

▶▶▶ THE COLLINS MANUFACTURING COMPANY has been discharged from further jurisdiction of the court under 77-B, it was revealed recently. The company had petitioned for re-organization since last fall and arrangements have been made to take care of receivers' notes and for the largest indebtedness, which was to the Whiting Estate, in the form of notes.

◆

▶▶▶ THE LIVINGSTON FIBRE BOARD COMPANY of Huntington, Mass., has been incorporated to manufacture and deal in fiber board, paper boards and papers, it was reported recently. The capitalization is 5,000 shares of stock of which 1,000 has been paid in. Fred A. Livingston and Alvan S. Clark are president and treasurer, respectively.

◆

▶▶▶ EASTERN MANUFACTURING COMPANY, South Brewer, Maine, has contracted for its 80,000 cords of pulpwood with the company's subsidiary, the Lincoln Pulpwood Company. The former concern also advanced the Lincoln company $58,583, being principal and interest due May 1 on a $300,000 mortgage. Authorization for both moves came from the Maine Federal District Court as the company is operating under 77-B.

◆

▶▶▶ THE GENERAL TIMBER COMPANY'S head office has been moved from Toronto to Port Arthur, Ontario. The company is operating in the vicinity of Heron Bay and has agreements with the Marathon Paper Company, Wisconsin, which, it is said, may bring about the establishment of a pulp plant in the Heron Bay district when markets appear satisfactory

◆

▶▶▶ NEWSPRINT PRODUCTION at the Dalhousie mill of New Brunswick International Paper Company was reduced to 55 per cent of capacity during the month of May, as compared with a production of 65 per cent during April.

◆

▶▶▶ PREPARATIONS ARE NOW BEING MADE for the establishment of permanent operating headquarters at Long Lac, Ontario, by the Pulpwood Supply Company, Ltd., which firm will construct a sulphite mill at Terrace Bay, Ontario, (cf. *Paper World*, P. 8, Oct. 1938). Survey parties are now operating out of Long Lac. Some cutting on the company's pulpwood limits was done last fall and further activities are expected to get under way within the next few months.

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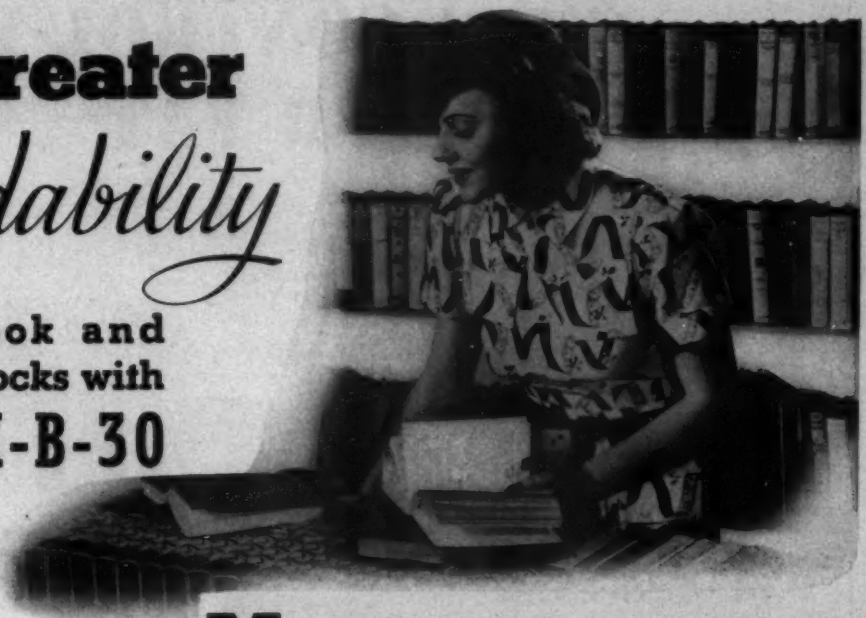

MANY publishers now are aware that white, bright, completely opaque paper adds immeasurably to the eye-appeal of any book or catalogue because it increases readability. Discerning paper manufacturers sensing this situation, are stepping up the whiteness, brightness and opacity of stocks for such purposes. TITANOX-B-30 is helping them to obtain splendid results.

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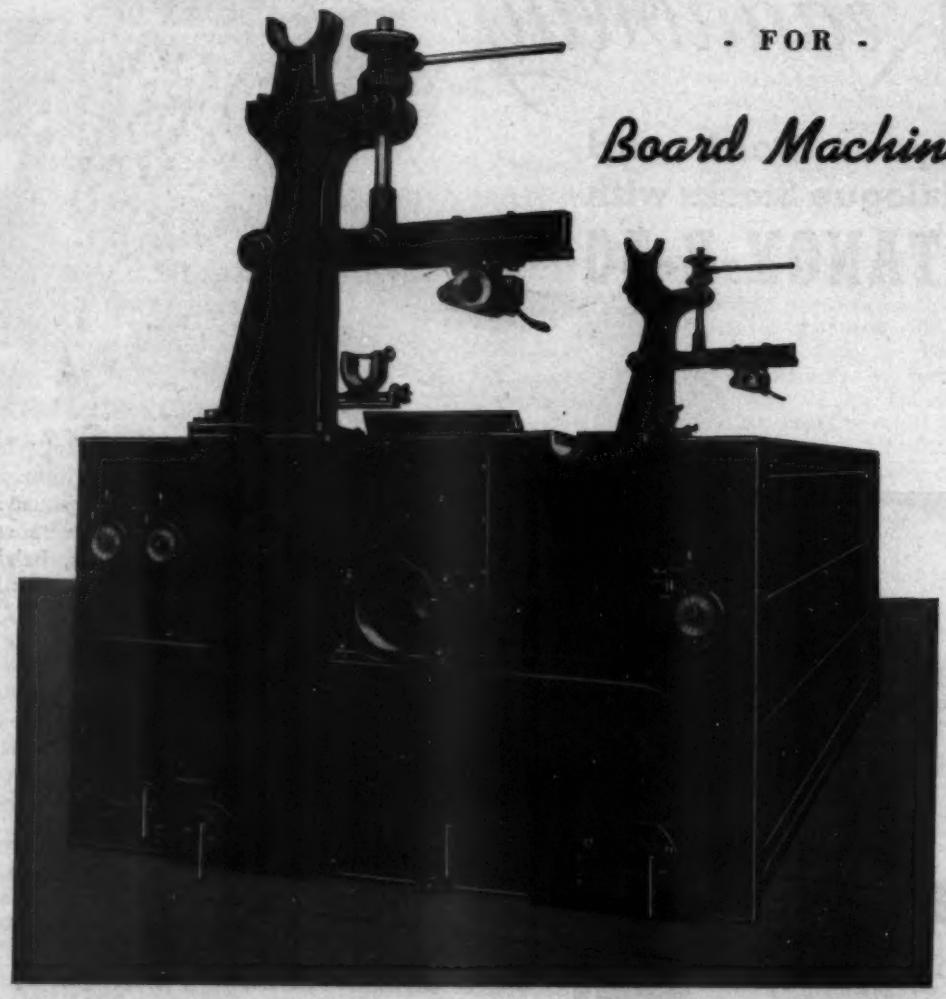

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TRADE MARK REG. U. S. PAT. OFF.

THE GREEN DIAMOND. Illinois Central Railroad. Speeds Smoothly On TIMKEN Roller Bearings.

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Ask any paper mill operator who uses super calenders equipped with TIMKEN Bearings what he thinks of them. His reply will be both enlightening and convincing—for even in this, one of the most difficult of all paper mill bearing jobs, TIMKEN Bearings have proved revolutionary in their results. They have cut power requirements radically; made starting easier; simplified lubrication; and greatly improved calendering quality.

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TAPERED ROLLER BEARINGS

CITY SAVES $38,000!

Read How City of Hastings, Michigan, Saved Over $6300 a Year in Pumping Costs and Cut Water Rate 15% . . . by Replacing Old Pumps with Allis-Chalmers!

THE WATER DEPARTMENT AT HASTINGS, MICHIGAN. City Engineer Bert Sparks inspects the pumps that have saved the City of Hastings as much as $6372 in a single year! They are an Allis-Chalmers 2½" x 2" Type SJH, rated 250 gpm at 150 ft. head, and two Allis-Chalmers 3" x 2½" Type SJH pumps, each rated 350 gpm at 150 ft. head.

Water rate reduced 15%! Reserve fund of $11,000 built up by a department that previously showed a deficit. $38,000 saved in pumping costs!

That's what actually happened in the City of Hastings, Michigan, when City Engineer Bert Sparks replaced steam driven reciprocating pumps with three Allis-Chalmers motor-driven centrifugal pumps!

It's not hard to understand why! The former fuel cost for steam-driven pumps was 6c per 1000 gallons pumped. But the cost for the Allis-Chalmers motor-driven pumps is only 1¾c per 1000 gallons. That means an actual average saving of $6372 per year to the City of Hastings, in pumping costs alone! $38,000 since the pumps were installed!

Allis-Chalmers Engineering Cuts Costs!

No wonder that when a fourth pump was purchased in the fall of 1937, the City of Hastings specified Allis-Chalmers! For the engineering that has created Allis-Chalmers equipment means lower costs . . . actual savings in dollars and cents. And like savings result from Allis-Chalmers assumption of undivided responsibility for both pump and drive!

What Allis-Chalmers Centrifugal Pumps have accomplished for the City of Hastings, they can do for your city or for your factory. The Hastings installation is typical of the way Allis-Chalmers has solved municipal and industrial pumping problems throughout the country. There's an Allis-Chalmers representative near you. Let him show you how Allis-Chalmers pumps can actually pay for themselves . . . how many dollars they can save!

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Called the founder of the English Alkali industry, James Muspratt built the first soda plant in England, at Liverpool in 1823. Soon afterwards he erected other plants in Lancastershire, adjacent to coal fields and salt deposits. Muspratt used the LeBlanc process. At first the soap and glass manufacturers were suspicious of this "British barilla", but later the demand became so great the crude furnace product was sent off hot as soon as it was drawn.

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800 Tons of Clean Pulp a Day

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Built by American Paper Mach'y and Eng. Works, Inc. SKF-EQUIPPED

When 800 tons of Kraft pulp flow through these APMEW Screens daily, you can be certain that every part must function perfectly. That is why the American Paper Machinery and Engineering Works, Inc., uses SKF Bearings.

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If you want a bearing that's used by practically every manufacturer of paper machinery, specify SKF.

SKF INDUSTRIES, INC., PHILADELPHIA, PENNA.

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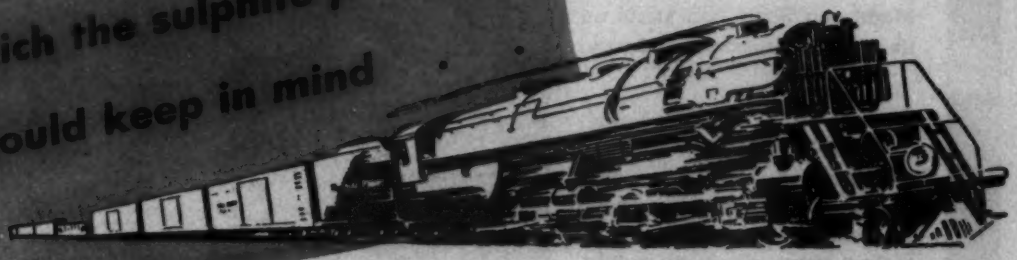
SKF

BALL AND ROLLER BEARINGS

Facts

which the sulphite producer should keep in mind



Two million tons of sulphite pulp are now produced annually by the Chemipulp Process representing the following annual savings to the sulphite pulp mills on the North American Continent - - -

COAL

150,000 tons of coal, which is equivalent to 3000 carloads of 50 tons capacity, or 30 solid trains of 100 cars each.

SULPHUR

40,000 tons of sulphur, which is equivalent to 1000 carloads of 40 tons capacity, or 10 solid trains of 100 cars each.

LIMESTONE

40,000 tons of limestone, which is equivalent to 1000 carloads of 40 tons capacity, or 10 solid trains of 100 cars each.

WOOD

The wood saving is variable due to the quality of the wood used and length of the cooking time. Normally, however, this represents an average saving in wood of approximately 206,000 cords, which is equivalent to over 9000 carloads, or 90 solid trains of 100 cars each.

CHLORINE

In addition to the above savings, mills that are bleaching their pulp are also realizing substantial reductions in the amount of chlorine required.

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WHETHER the soda ash you buy represents a major raw material purchase or is merely incidental, you use care in selecting your source of supply. First, of course, you ask the natural questions about quality, price and delivery. But you also want to know something about the company with which you are to deal—its policies, its resources, its facilities for rendering service.

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CCH (INDUSTRIAL HYPOCHLORITE) . . . DRY ICE (CARBON DIOXIDE ICE) . . . ANALYTICAL SODIUM CHLORITE

Editorial ★ ★ ★

LET'S DO BUSINESS

▶▶▶ PAPER is the sensitive index as to business conditions in the country. If there exists any doubt in the minds of our readers that this is a fact, just glance at the following record of paper demand in probably the most sensitive of the divisions of paper production—the kraft paper division of the paper industry.

For the week ending January 1, 1938, the volume of general business in the country measured by *Business Week* index was 65.8 per cent of the 1926 volume. For the same week, the per cent of capacity operation of the forty-six mills of the kraft paper division was 41 per cent. Thereafter, each succeeding week showed a continuous and unbroken decline in the general business volume until the week ending March 5 when it stood at 56.9 per cent. As against that record of decline, the percentage of capacity operations for the kraft paper industry advanced steadily from 41 per cent on January 1, to 66.5 per cent of capacity for the week ending March 5, 1938.

Now, 56.9 per cent is the low for this year on general business volume in the United States, and for the succeeding thirteen weeks since March 5, general business volume has gone up to 59.3 per cent for the week ending April 16, then back to 57.4 per cent for the week ending May 7. Since then, it has slowly, but steadily risen to 59.1 per cent for the week ending May 28.

In the same period from March 5 at 66.5 per cent, the percentage capacity operations of the kraft paper mills on April 2 receded to 64.8 per cent and from that date, each week has shown a steady increased percentage of capacity operation until it reached 72.2 per cent for the week ending May 21, the last figures obtainable.

So, on the last obtainable comparable date, general business volume stands at 59.1 per cent while demand for kraft paper is 72.2 per cent of mill capacity.

On January 1, 1938, the mill capacity operation percentage was 14.8 points *under* the general business volume figures and on May 21, the mill capacity percentage figure was 13.9 points *over* the general business volume figures, a flop of 28.7 points between the relative positions.

And, this is not all. The marvelous fact is still to be told, which is that 72.2 per cent capacity operation for the kraft mills this year is really 84 per cent based on last year's mill capacity for the kraft mills increased this year a total of 212,000 tons of capacity and are now operating 72.2 per cent of this added figure, which proves what?

That paper, that supersensitive American product, is reflecting a constantly growing activity of business, not reflected in the general business volume figures.

Of course, the kraft paper division is to be congratulated upon this volume of business, but all other divisions likewise show a percentage of capacity operations which are also substantially above the general business volume figures.

Now, these are facts, not theories, or guesses. It is facts which dispel fears, and facts like these should put an end to any sulking or defeatish attitudes on the part of business men.

Business is headed for substantial upturns which these facts so indicate.

We have the best crop prospects in years.

We have billions of idle money which want to work, and millions of idle men who want to work for it.

Let's join hands and do business.

BUSINESS CERTAINTIES— PUT THEM TO WORK

▶▶▶ SO MUCH is said today of the uncertainties of business; too little of the certainties. Wherever one goes, in the home, on the street, in the office and factory, or any other place where two or more people come together, it is likely that sooner or later some reference will be made to the present economic uncertainties.

The common wail is that "I can't do this," and "I can't do that—business is too uncertain." Maybe all that is desired, and for which plans have been made, is a new suit of clothes; or is it the purchase of some new equipment to increase the efficiency of production operations, or the expenditure of a budget that previously had been allocated to sales promotion activities?

The size or nature of the item makes no difference. It is the attitude of mind that counts. The suit of clothes isn't bought. The equipment isn't purchased. The sales promotion budget is left intact.

What is the result? A growing fear grips the mind. Business slows up. Progress is impeded.

If everyone bought what he wanted and could afford, there would be no business recession. There would be work for everyone, and progressive development of people, industry and business would continue.

Normal buying will resume only with a restoration of faith—faith in the future of the United States, in its institutions, and in ourselves as human beings. This faith can be restored through a proper mental approach by a majority of its people. Thinking and acting in terms of constructive business certainties, of which there are plenty, will be an aid to this end. Catalogue in your own mind all that you can muster and then put them to work.

CLEAN UP YOUR MENTAL HOUSE

WILLIAM SIBLEY

If your janitor should leave as much dirt on your desk as you carry around every day in your mind you would fire him on the spot. Dirt—is matter out of place, and matter out of place misrepresents. Newspapers, piled correctly on a news-stand are not dirt. A shovelfull of earth out in the corn field isn't dirt. But litter your office floor with strewn newspapers and even a pound of earth and you have a very "dirty" floor. The litter misrepresents not only itself but the floor you walk on. It's the same with that mind of yours (and mine). We all carry too much mental dirt around for true clarity of thinking. Mental dirt, for the most part, is straight out-and-out prejudice, sired by misunderstanding and mothered by stubborness. And right now, in these times of mental stress and strain perhaps more than anything else, we need clear thinking. So for the love of our near-future welfare police your mind and keep it clear of prejudice.

Just a few days ago I had the digestion for my luncheon ruined by the superficial, dirty thinking of my two companions. During the meal one of them vouchsafed the information that, without exception, all the motor-car manufacturers were going to close up their plants and abandon production and forego 1939 models next August first—unless the labor situation was ironed out to the satisfaction of all. Then he immediately went on to say that he didn't believe it—but thought perhaps it was merely a "whispering campaign" projected by the motor men to get the Government and labor union leaders into such a state of fright that an early adjustment would be made. Whereupon the other "nut" with whom I was eating said: "Horseradish! That's a whispering campaign on the part of the Government to raise the tide of resentment against so-called Big Business so they can still further crack down on all phases of business."

Now isn't that just too silly to justify comment? The only thing I should like to know is how in the name of common sense two grown men can say such things and still give credence to their own sanity. A piece of sheer bunk—a malicious lie—caught up and nurtured to maturity on prejudices.

And right at the same table, mind you (after I had rather successfully squelched such shallow assertions) one of the men fell to mouthing one of the popular words of the day: "dictatorship." And that's another thing that gives me a pain in the region of my collar-button. It is true that many people and many newspapers declare that Mr. Roosevelt either is now a dictator—or is going to be—or would like to be—or is trying to be. But who ever heard one of these same men, whether on the street or in the editorial saddle, say that the Prime Minister of England was a "dictator"? You never did. But you can believe this: if any President of the United States had even a fraction of the powers granted the English Prime Minister, not only would he be our Chief Executive but he would be a majority leader in the House over which the Senate could exercise neither control nor check. If he had the powers of the Prime Minister he could raise or lower tariffs by order of council, solehandedly; he could write a treaty with a foreign power without public hearings; he could so regulate the House of Representative's legislative program that no law would ever pass which would require his veto; he would have no Supreme Court as a check-mate or to use as a check-rule; he could call a general election at any time (within five years of office) he felt himself sufficiently strong with the public to be re-elected. With such powers the President could actually shift the election of United States Senators from state to state thereby assuring himself either of their defeat or their re-election, depending upon his personal wishes. But I didn't argue the point. I gave up and ate my lunch as best my ruined appetite would permit.

Lies are a form of mental dirt. Lies, worry, doubt, fear, distress. Of course *you* don't lie (unless you're married). But why allow others to lie to you? You might as well lie yourself as admit a lie from others. Lies are terrible things. They are mosquitos with buzzard wings and the voice of a Big Bertha. They can be heard from Kamchatka to Edmonton and they have caused more trouble than all the Kansas cyclones, Missouri tornadoes, California weather, Florida real estate men, yellow fever, gout, boll weevils, rust, smut, ticks, fleas, potato bugs, rattlesnakes, scorpions, booze, snapping turtles, indigestion, mad dogs, blizzards and floods than we have ever known or ever will know. Lies destroy governments. They destroy business. They destroy faith.

Back in the early days one liar said George Washington was a woman chaser. Another liar said he was a thief. This second liar started an investigation and proved, at least to his own satisfaction, that George had stolen $2,000 from the United States Treasury. One newspaper in New York City, sixty days before the termination of his first four years in office, said: "If this government can stand two more months of Washington, it will be well nigh indestructible."

Funny . . . ? No more so than the political and economic lies broadcast today. Why do you let 'em get away with it? Why do you let 'em continue to lie to you? Letting a lie go unchallenged is tantamount to aiding its progress. Sweep away the mental dirt—the lies, the doubt, the fears. Do it with the same aggressiveness you display when you attack the morning newspaper and with the same fervor with which you breathe your daily prayer, as you enter the office: "Give us this day our daily mail."

SPEED CONTROL with a Twist of the Wrist WHILE THE MACHINE IS IN OPERATION

● Accurate, instantaneous speed change—without shutting down the machine—that's what the Link-Belt P. I. V. Gear makes possible.

It is an all-metal, unusually compact unit, available for horizontal and vertical mounting of the basic unit; also motorized and with gear reduction sets. Can be arranged for manual or automatic operation.

Simple and easy to operate—a turn of a hand wheel sets the indicator at the desired speed and the machine changes instantly. There are no "steps" or frictional contacts—a positive chain drive with opposed conical wheels varies the speed to any degree desired—even to a fraction of an R.P.M.—in one single, quick movement. Use it for greater machine versatility—to adapt machine speeds to long or short runs, frequent changes in character of work, etc.

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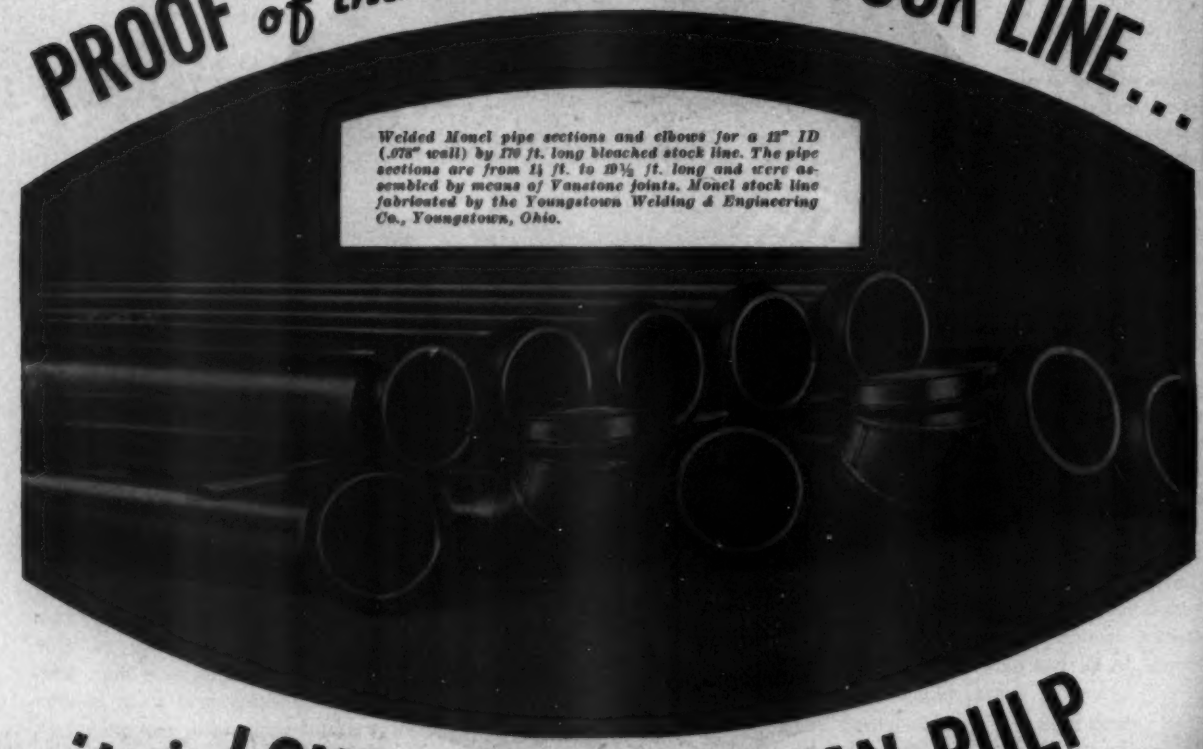
PROOF of this BLEACHED STOCK LINE...



Welded Monel pipe sections and elbows for a 12" ID (.078" wall) by 170 ft. long bleached stock line. The pipe sections are from 1¼ ft. to 10½ ft. long and were assembled by means of Vanstone joints. Monel stock line fabricated by the Youngstown Welding & Engineering Co., Youngstown, Ohio.

...is LONG LIFE and CLEAN PULP

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Proof? Glance at the job shown above. A repeat installation, it results from the exceptional performance of several hundred feet of Monel stock line that has seen over seven years' service.

Write for further information on Monel. Ask for Bulletin C-3 "Monel in Pulp and Paper Mills", T-5 "Engineering Properties of Monel", and "Welding of Monel and Nickel". Address:

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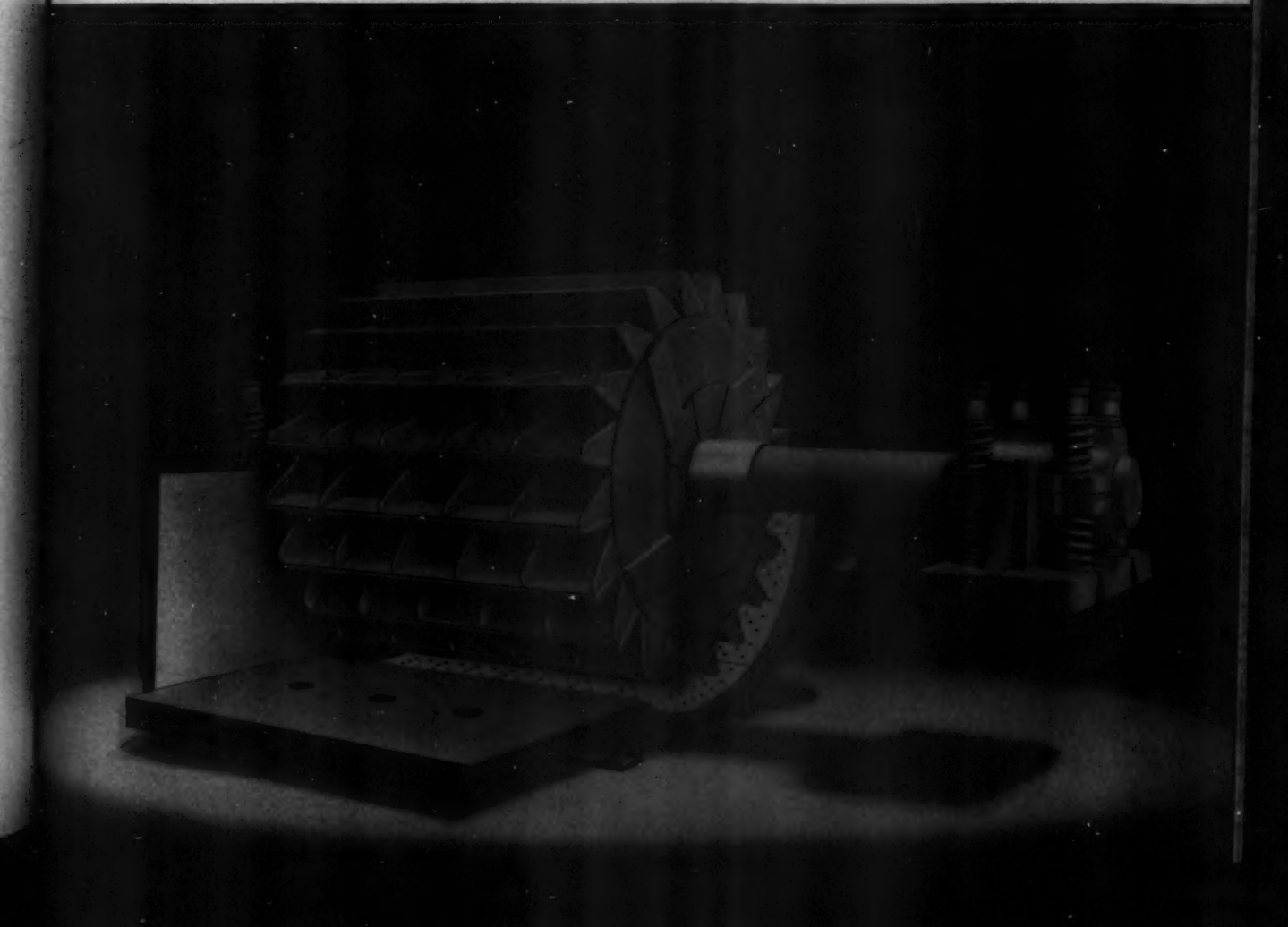
- BREAKER BEATERS—A Dilts built unit for continuous or batch operation.
- OPERATING ECONOMY—Trash-free spindles assure low power consumption while rugged construction gives continuous trouble-free operation.
- BREAKER SYSTEMS—The Dilts Breaker Beater can effect economies and increased production in your present system. However, in the Dilts Breaker Beater method of pulping, the increase will be much greater and at the same time show a substantial saving in power consumption.

Our able engineering staff will gladly consult with you on your individual requirements without obligation to you. Write for details.

DILTS MACHINE WORKS, INC., FULTON, N. Y.



Rejects Eat Profits

GET UNIFORM DRYING WITH ECONOMICAL TENSO-TEMP CONTROL

Tenso-Temp Drying Control in an Eastern Mill

Tenso-Temp Automatic Drying Control protects profits by eliminating rejects due to uneven drying; by increasing the capacity and efficiency of the dryers.

Tenso-Temp Control is fully automatic, requiring a minimum of manual attention. It saves operating expense by instantaneous shut-off of steam to dryers when sheet breaks; it holds temperature gradient at correct point until sheet is taken over.

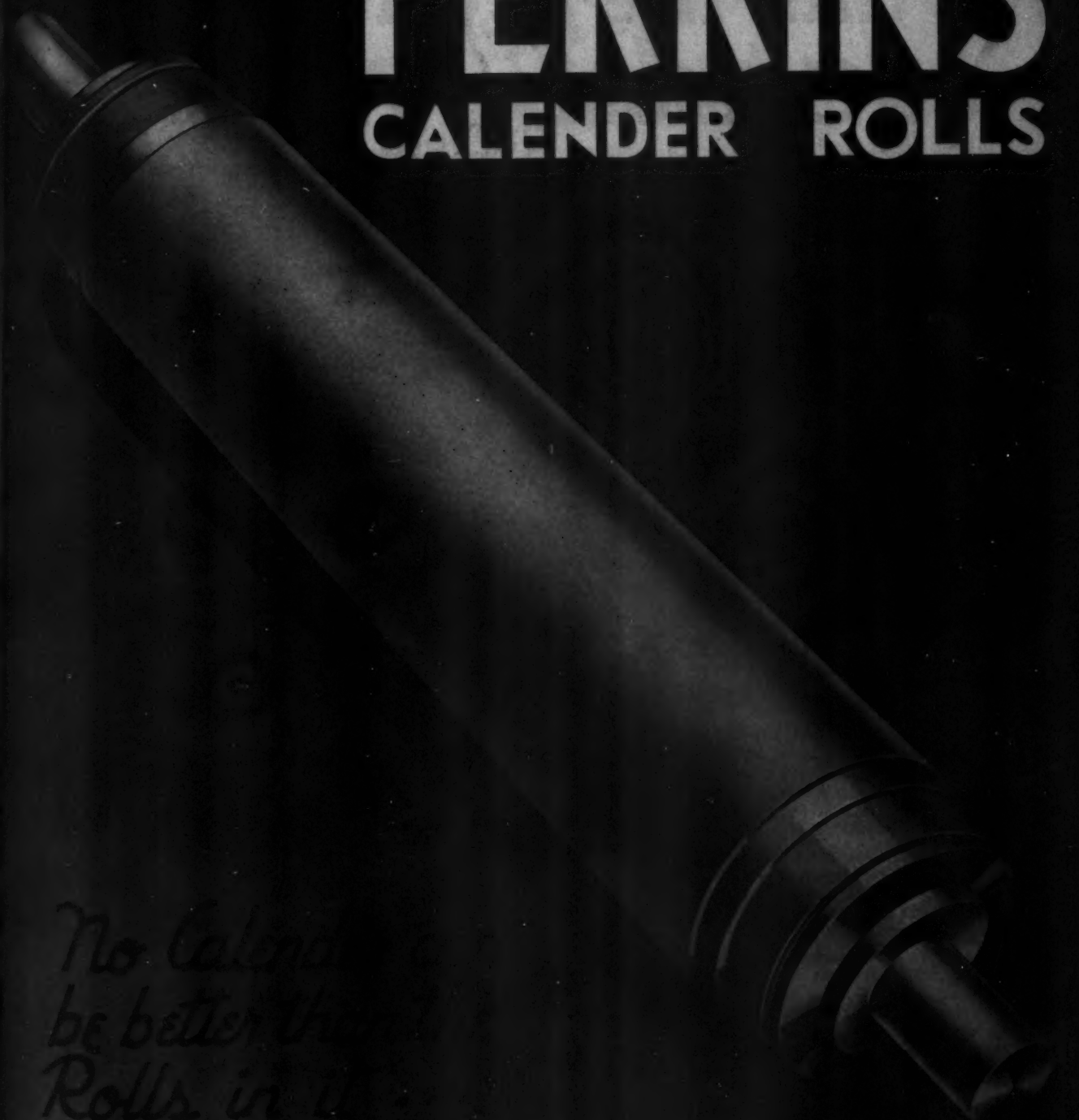
Low first cost, installation cost and maintenance expense are other economy features.

Tenso-Temp is saving money for scores of mills in the United States and Canada—providing accurate trouble-free control. It will pay you to consider modernizing with Tenso-Temp. Write for Bulletin PD-1.

MASONEILAN **1196 ADAMS STREET, BOSTON, MASS., U. S. A.**

New York Philadelphia Pittsburgh Buffalo Chicago St. Louis Tulsa Houston Los Angeles

PERKINS
CALENDER ROLLS



No Calend
be better t
Rolls in

B. F. PERKINS & SON, Inc.

HOLYOKE • MASS.

Dulls the teeth of Corrosive Acids . . .

Strips of lead with and without tellurium content after immersion in 96% sulphuric acid at 385° C. for 3 minutes. Tellurium lead weight loss, 0.97% — other lead, 5.11%.

New Low Price Now in Effect

Tellurium Lead is now extensively used to line tanks and for pipes and coils, in plants handling sulphuric and sulphurous acids, hot chrome solutions, copper sulphite solutions, chlorine gas, hydrochloric acid fumes and hydrofluoric acid.

EVIDENCE in favor of Tellurium Lead is piling up. First came laboratory tests like the one illustrated above. They indicated that Tellurium Lead held possibilities in the direction of greater acid resistance, even at the higher temperatures.

Now these laboratory results are verified by plant service covering a wide variety of applications in many industries. In the panel at right are two typical service reports.

Another important quality of Tellurium Lead is this: It possesses the property of strengthening under stress. In other words, it work-hardens. Stretching, bending, hammering and other forms of mechanical action increase the tensile strength and fracture-resistance of Tellurium Lead. In addition, Tellurium Lead affords superior resistance to fatigue failure caused by vibration.

Tellurium Lead of our manufacture is St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this time-tested chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write to nearest branch.

A MANUFACTURER REPORTS:

"We used your tellurium sheet lead to line an acid-cutting tank. Strong sulphuric acid is dumped into the tank and sufficient water added to bring it to the proper strength. This naturally generates considerable heat. The operation has been repeated daily for nearly three years. To date no leakage or other difficulty has been experienced. The lining is as good as the day installed. We feel that Tellurium is entirely responsible for this as we have never before had such a favorable result."

• • •

ANOTHER USER WRITES:

"I wish to say that your tellurium lead pipe has proven all you claimed. It is easy to weld and easy to flange. Also the flanges stand up a good deal better than ordinary lead as they seem to actually become stronger at the turnover point."

NATIONAL LEAD COMPANY

New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis; National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co., Pittsburgh; Georgia Lead Works, Atlanta; Gibson & Price Co., Cleveland; American Lead Corp., Indianapolis; Master Metals, Inc., Cleveland; The Canada Metal Co., Ltd., Toronto, Montreal, Winnipeg, Vancouver.

Tellurium Lead

"Born a Dryer Felt, It Turned Steam Hog Long Before It Died!"

Those two lines might frequently serve as an epitaph for an asbestos dryer felt—when what it saves through longer life is lost several times over through increased steam consumption.

Because of its higher first cost, an asbestos felt starts life with a handicap. To break even in any price comparison with a cotton felt, it must always last from 60% to 70% longer.

A given asbestos felt *may* last that much longer than a cotton felt under comparable conditions. But, in too many cases, before its life is half over, the asbestos felt starts to glaze over and fill up; and, from that point on, more and more steam is required. In spite of the longer life, the result, of course, is a much higher *TOTAL* cost per ton of paper dried.

No Other Asbestos Felt Contains More Asbestos Than the HOOPERWOOD!

•

There is no such thing as an "All-Asbestos" Dryer Felt, and there is no other asbestos felt that contains more asbestos than the HOOPERWOOD. The very nature of asbestos fibre makes it impracticable for any manufacturer to use more than about 60% asbestos and about 40% cotton in the production of a dryer felt.

We will be glad to show you how you can avoid this problem with either a HOOPERWOOD Cotton Dryer Felt or with the ALL-WOVEN construction—never merely *built-up* and pre-stretched—of a HOOPERWOOD Asbestos Dryer Felt.

WM. E. HOOPER & SONS COMPANY

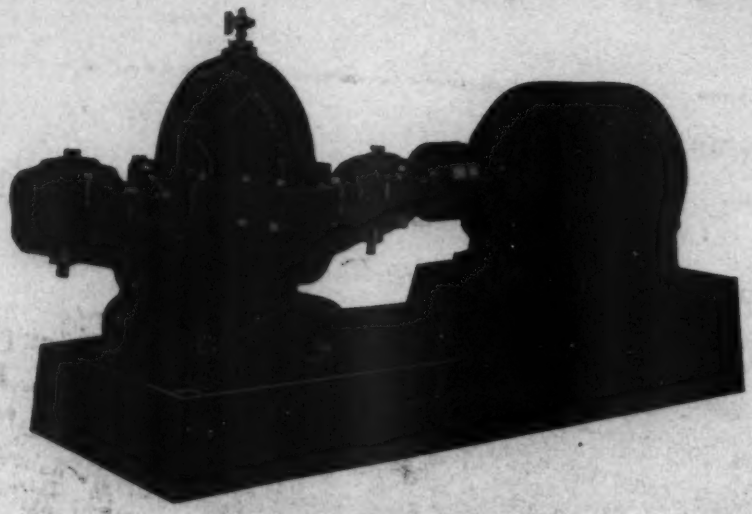
General Offices: Juniper and Cherry Sts., Philadelphia · 320 Broadway, New York City · 300 W. Adams St., Chicago, Ill.

Selling Agents: GENE BECHARD, Atlanta, Ga. · HARRY W. STRATTON, Portsmouth, N.H. · M. E. AVERY CO., Watertown, N.Y. · DANE CHARLES, Seattle, Wash.

HOOPERWOOD ASBESTOS AND COTTON DRYER FELTS

19 Years of Service

without one Cent for Repairs!



"Buffalo"

Another Example of PUMP PERFORMANCE

"This pump has run continuously in the winter for approximately nineteen years without repairs," writes a Pennsylvania manufacturer.

The comment is typical of many we have received, and tells the story of the high quality of Buffalo Pumps better than anything we might say about details of construction.

When all is said and done, it IS "Performance that Counts". If you want top performance in your pumps, simply tell us

1. What Quantity?
2. What Liquid?
3. What Head?

We shall gladly give you the benefit of over 50 years' experience in the successful solution of pumping problems for industry throughout the world.

BUFFALO PUMPS, INC.

213 Mortimer St. Buffalo, N. Y.

Branch Engineering Offices in Principal Cities In Canada: Canada Pumps, Ltd., Kitchener, Ont.

"Buffalo" PUMPS

used where Performance Counts

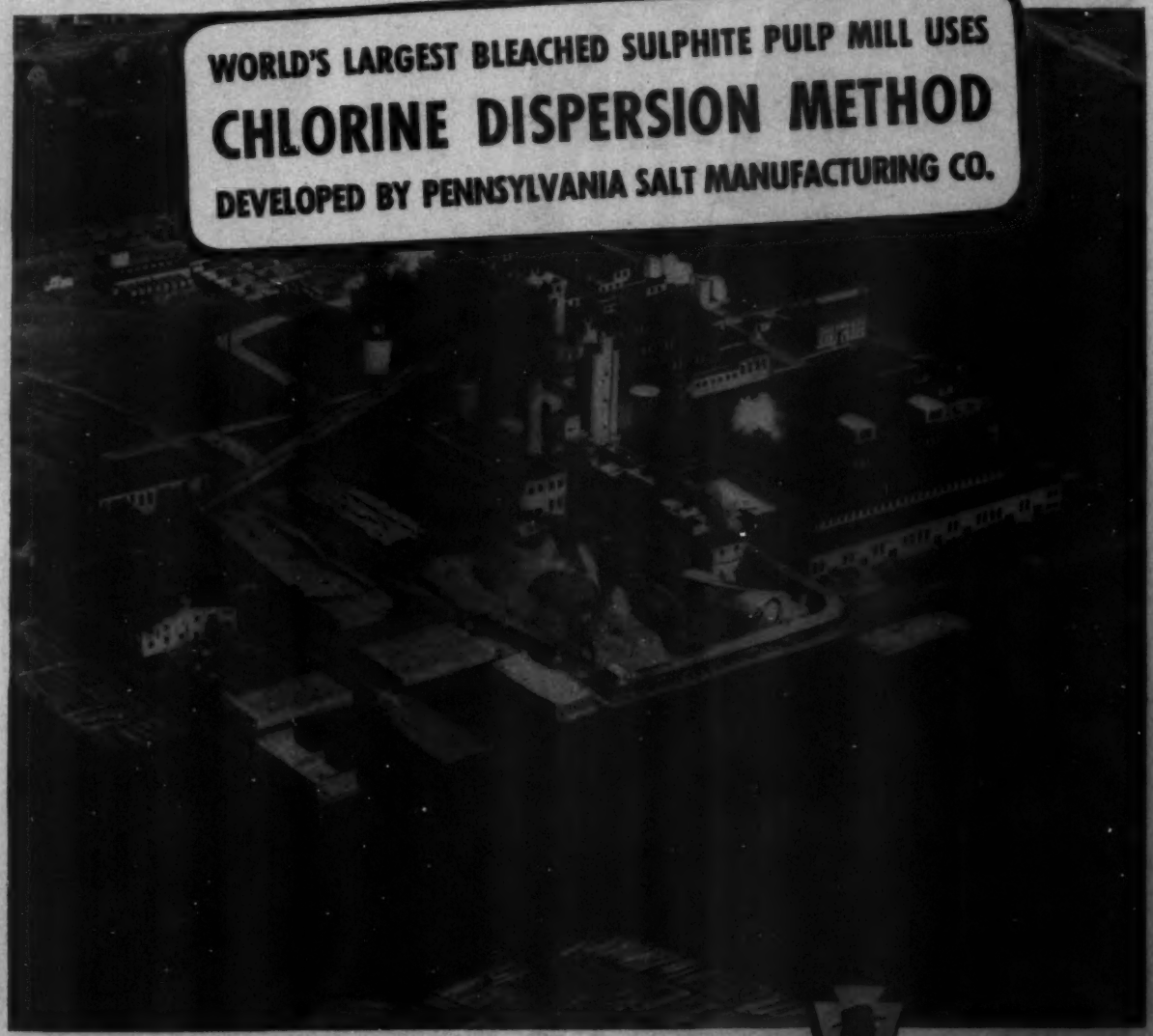
THE Soundview Pulp Company is known for the fine qualities of its sulphite pulp by paper mills throughout the United States and in many foreign countries. This mill is considered one of the most modern—in design, construction, equipment, and methods. Operating the largest mill in the world, this company reached a production in excess of 500 tons per day shortly after the completion of a recent expansion program.

Soundview uses Pennsylvania Salt's Liquid Chlorine and Caustic Soda, and since 1935 has used the Pennsylvania Salt Chlorine Dispersion Method* in one of its units.

PENNSYLVANIA SALT MANUFACTURING COMPANY • Est. 1850
Widener Bldg., Philadelphia, Pa.
New York • Chicago • St. Louis • Pittsburgh • Tacoma • Wyandotte

* U. S. Patent 1,971,241, dated August 21, 1934. Also fully protected in twelve foreign countries.

WORLD'S LARGEST BLEACHED SULPHITE PULP MILL USES
CHLORINE DISPERSION METHOD
DEVELOPED BY PENNSYLVANIA SALT MANUFACTURING CO.



Soundview Pulp Company's mill at Everett, Washington

PENNSYLVANIA SALT
Chemicals

POWELL IRON BODY VALVES

Records show Powell Iron Body Valves endure far beyond specifications. Their rugged construction and workmanship have long been recognized by plant engineers who demand unusual valve performance.

FIG. 1440
SCREWED END "MASTER PILOT"
GATE VALVE

FIG. 1444
FLANGED END "MODEL STAR"
GATE VALVE

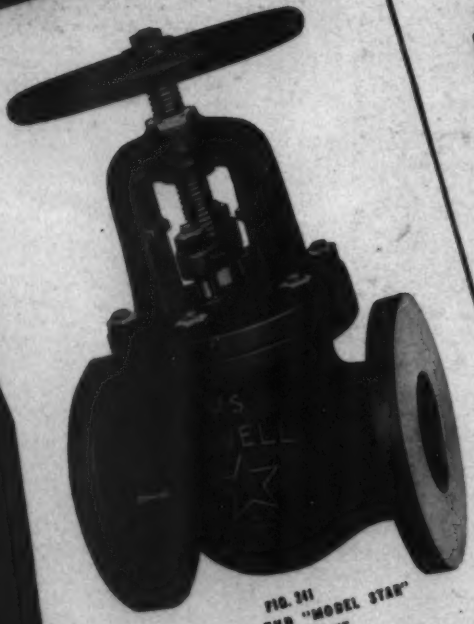


FIG. 241
FLANGED END "MODEL STAR"
GLOBE VALVE

For complete information on Powell Iron Body Valves refer to the Powell new No. 11 Catalog.

POWELL VALVES

THE WM. POWELL CO. CINCINNATI, OHIO.

Cellulose in the Cinema

A. B. LAING

Above—Paper in vertical stripes used in portrait galleries to accentuate height of the subject. A Paramount star.

Left—Arletta Duncan and Billy Bakewell enact a dramatic scene from "Love in the Oven." Through windows of parchment a soft back-lighting is diffused onto the characters, while composition board walls are papered in a pleasing plaid design of high reflective qualities.

IF Hollywood has become one of the largest single customers of the paper industry, as Will Hays reports, then nearly every reader of THE PAPER INDUSTRY AND PAPER WORLD may claim a role in the movies, and, therefore, may wish to glance through his part.

Paper's contribution to Creation-of-Illusion (America's fifth largest business) subdivides into: (1) *The Story Germ,* via copy, bond and mimeograph stock; (2) *Production,* plans, forms, inserts, set-construction; (3) *Exploitation,* stills, stories, stunts.

In film making, actors and actresses are relatively insignificant. Of the 2,200 employees on one lot, scarcely ten per cent ever have been chased by a microphone boom or caught by the camera. They are departmentalized representatives of every craft, from precision machinists and electroplaters to armorers, thatchers and fletchers, and among this backstage army of toilers in every studio no group is no more currently vital than the writers.

Whereas five years ago Mr. and Mrs. Public went to a theatre to gape at a star, today they want to see a show; apparently, "the play's the thing." Consequently, money paid for scenarios has lured novelists and playwrights westward to the point where, ignoring the freelancers, one finds about as many writers as players under actual contract.

Their daily dramatic submissions account for much of the higher grade bonds shipped to the coast, for the paper demands of this group are for better typescript "with lots of crackle" and covers that will invest an offering with distinction, making it stand out from the daily mountain of manuscripts. "Just show me something hot and I'll buy it," says one successful wordsmith.

Once shooting begins, under normal overhead of around $2500 per hour, a special cigar holder or writer's badge mislaid (after registration in close-up) may cost money by the time a duplicate is cast in the studio foundry. Partly for this reason, moving picture companies exercise considerable pre-production care, precautions which are reflected in the assembly of written forms and schedules completed before work is begun; perhaps no other business can show such an array. Metro-Goldwyn-Mayer, for instance, will buy about 10,000 reams a year largely for this purpose.

Release of an almost novel-length master breakdown, made from the final shooting script, is the starting gun for every film. From this document, mimeographed on foolscap

Most frequently used screen insert is the calendar. Nearly every picture requires a specially printed calendar to denote passage of time. Ides of March approach so Hollywood rounds up some pretty girls, a lion and a lamb. The girls are from Paramount's "College Swing" and even the gruff lion and the woolly lamb were pleased to "swing it" with them.

usually, each department compiles its respective shop drawings and forms. The research department combs volumes and files of magazine advertisements and articles for authentic ideas on atmospheric background.

The art department, upon receipt of the research department's swatch of clippings and reports, unrolls its cylinders of tracing paper. For the benefit of picture directors who are seldom architecturally-minded, there are drawn crayon perspectives of each of the 15 to 100 sets, often supported by scale models done in parchment, this being sufficiently stiff for wall representations yet suspectible of realistic tinting. When approved, draftsmen get out blueprints—full size, scale, phantoms, elevations—in an attempt to make them intelligible to the humblest worker and for graphic guides to cameramen and other technicians. Odd as it may seem, a picture's temporary sets, budgeted at say $85,000, will rate as many, if not more, sheets as are found in lay-practice on jobs of equivalent costs.

Meanwhile the jewelry department sketches full size water colors of the gems it proposes to manufacture. For the director's approval, "wardrobe" likewise submits a score or so of paintings. Such color work is customarily executed on artists' mat board or charcoal paper, 15 inches by 22 inches being a popular size.

The kind and number of sets are governed by dramatic considerations and the imaginative capacities of the human brain, hence quantities of composition board and blank stock cannot be foretold accurately. One background may consume no more square feet than are found in the side wall of an airliner, the entrance to a church or the boiler fronts of a cruiser's stokehold, while the next item on the breakdown may be Rome's Circus Maximus. However, Lynn Buell, Paramount's purchasing agent, orders thirty carloads of pressed wood products annually. More malleable on turns and curves, these insulative flats (as ready-framed wall panels are designated in the show business) present no accoustical problem since the material, by its nature, obviates microphone reverberation and echoes, two bugaboos of the more rigid wall construction. (Sounds like a tip which prospective homebuilders could well take from the movies. Maybe some composition board manufacturer might like to pass it on to the public.)

In the application of wall board, moviemakers are ever on the alert for new surfacings and panel joints that will yield decorative variety. One is constantly reminded that novelty is the essence of showmanship. Therefore, as a peculiar by-product of this phase of theatrical entertainment, the papermaker gets a subtle though effective legup sometimes, for it is estimated that nine out of every twelve pictures released carry new ideas in domestic design and fitments which are followed by picturegoers in their homes. Just as Mrs. America regards the styles in gowns worn by the stars as the last word, so she has come to accept the appointments of the set as an indication of good taste. Indeed certain backgrounds have evoked fan mail of themselves to such an extent that Hollywood producers take cognizance of the box-office drawing power of brilliant design. Speaking of this world-wide influence on buying habits, Will Hays says "Hardly a day passes that we do not receive confirmation of new trends in purchasing which have arisen as a result of the subtle power of suggestion which emanates from the screen."

On a Columbia stage, art director Gossoon has just rigged a smart penthouse apartment set of 22 rooms *en suite*. Composition board rooms carry blank stock laid horizontally with joints sealed by wood molds which have been pre-faced with chrome foil, a method of trimming which is being extensively employed. Another movie tip: Wonder if some enterprising paper man could build a national market for such a line of classical and modernistic molds and dadoes with paper shrunk or pasted on the finish sides? Their decorative possibilities are, of course, infinite, particularly in homes and shops done in the modern manner.

Extremely futuristic interiors are to be played down—according to a prominent Hollywood stylist, Hans Dreier, who predicts "something very personal, warm and emotional. Not that we are falling back on well-known period styles in paper and furnishings. We are attempting to put more decor into life—something that is added simply for beauty's sake to round off the edges of utility."

To translate the trend into purchase orders, it will take about 6,000 rolls of Georgian (for use on interiors depicting the Georgian period), 2,000 Chinese (in the more exotic and darker designs for use in homes of the Orient), and about 100,000 blank stock to cover Hollywood's flats this season. Embossed designs in the lighter shades often will imbue some romantic love scene with much of its lyric charm. On the other hand, no pattern is too harsh or bizarre, when stark horror is the mood to be imparted to both participants and the audience. Hence, wall paper manufacturers can sometimes unload their cats and dogs on the movies.

Washable wall paper is specified when characters are to hurl pies or squirt soda siphons at one another in some night club brawl; its impervious finish is readily wiped clean between rehearsals.

Nelson Beck, scenic head at Universal, had no complaints on the quality or available patterns of the paper he was buying. He said, however, that he wished the makers would go a step farther and get out a more complete selection of

marble effects so he wouldn't have to dip lengths of blank stuff on floating ink to simulate the veining. Also, he wondered if it wouldn't be worthwhile from a manufacturer's standpoint, in view of potential movie business, to introduce paper patterns blocked off as tile, mosaics, parquetry, etc.

Papier-maché is another of the showman's friends. This versatile material may be seen emoting as huge boulders in some avalanche sequence, or as heavy structural members in the base of a bridge, ships' guns, and so on.

Waste paper, however, is the latest development. It is now getting onto the screen by way of discarded envelopes which held the stars' fan mail—those thousands of missives, sweet and sour, written with loving care to yearned-for favorites or addressed with bitter venom to the loathsome "heavies." Fifty thousand such covers were requisitioned for "The Buccaneer" and strewn to the waves when pirate Jean Lafitte boarded a merchantman. Other bulky packets figured in "Wells Fargo" and are scheduled for hotel desk and post-office depictions from now on.

By means of this device, a good director will often substitute a bit of paper for a bit of acting. Suppose John Doe has been sentenced to jail, or say a presidential candidate embarks on his campaign tour. Time was when the male-factor would be transported to some courthouse, along with the technical crews, and photographed as he was led off handcuffed to a cop. And the aspiring politician would be filmed on the platform of an observation car as he harangued the crowds assembled at the various cities. Instead, nowadays, newspapers are printed with headlines "Doe draws 15 years at Sing Sing," and "Country rallies to support of....," etc. Much money is saved while the action of the piece is accelerated and pleasantly varied. Normally, this scheme provides a constructive outlet for odd lots of linotype slugs with which extraneous columns are filled; but on one occasion (a closeup) to insure that no copyrights were infringed, a studio artist was assigned to compose a complete comic section, one guaranteed to amuse kids in the audience.

Titling is done on black glazed cardboard, text being set on the Intertype and run on a Chandler & Price press. For the lead and credit lines, show card stock in new mottles and coatings that carry good photographic values are constantly sought. Speaking from first-hand knowledge, the author, who is the production arranger for a well-known commercial film company, well remembers the two hours spent examining paper textures and air gunned cards for this purpose when the action of a recently sponsored picture had all been filmed.

Millions in phoney currency. Fox Studio Prop Department. "Hand prop" head. Charlie Perron.

Producer Louis Weiss (center) points out last minute changes in the script to director Elmer Clifton who in turn instructs Gwen Gaze, the star. This 600-page scenario of the serial "Secrets of Treasure Island" is one of the longest on record. (Photographed exclusively for THE PAPER INDUSTRY and PAPER WORLD.)

Paper figures from start to finish, for the final step is the music score. As the composers jot down their notes, there is always a chance that one of their number may catch public fancy and the hit tune may sell a million copies.

To the end that upwards of eight million people per day will pay their money, seven days per week, for the product followed through the factory in this article, the advertising campaign is begun, which, if you reckon all usual media, plus dramatic columns of the world's dailies and inter-dependent fan magazines, probably is unparalleled for paper consumption in the history of commerce.

As nearly as can be estimated, over a million 8x10 photos are mailed each month, and the shots of themselves which individual stars post at the behest of the fans would doubtless swell that figure. Posed excerpts from forthcoming productions and the news and gag shots published everywhere are sent out captioned by a new combination of letter-press and photographic printing to take photo-postal rates. Those earmarked for magazines like *Cinegrafia* of the Argentine, our own *Harpers Bazaar*, and certain masterpieces of the publishing art in Italy, Japan and Turkey, are printed from the negative to double-thickness printing paper to assure the finest possible halftones.

In this picture-minded generation, such graphic sales canvasses have been of potent aid at the gate.

But there are those publicists in Hollywood who hold to the old Chinese proverb that one picture is worth 1,000 words, a school which argues that an illustration in a periodical is only a guide post to pique the reader's curiosity and point his eye to the related text matter. So "stills" are accompanied by an equal number of blurbs and stories, consigned direct to editors who are not represented by resident reporters.

Certain local press corps members of the author's acquaintance receive from 6 to 10 lb., on the average, multigraphed releases weekly. These are attractively bound with lead pages or covers printed in color. A single sheet of this legal-length stock may be filled with double-space description of a filmic episode, or may carry only a three-line fashion hint. Asked regarding this apparent paper waste, the publicity dean,

John Leroy Johnson, pointed out that white space is no economic loss if it succeeds in its object of snagging the attention of editors, columnists and radio commentators.

Because many bulky despatches go to remote publishers, "the news" must sometimes be anticipated. Fiction writers make the best reporters for they are better able to describe an event which took place next month.

When Simone Simon was signed in Paris, Fox took 25,000 American billboards (@ about $10 each) sheeting the diminutive starlet with stupendous, colossal and gigantic superlatives in the best circus tradition. It paid.

Solicitations of individual theatre owners account for a relatively moderate amount of coated paper; print orders for each picture rarely exceed 20,000. Hitherto gaudy and flamboyant, these newspaper-size appeals now tend toward the highest artistic standard in layout and typography, with some companies turning to spiral bound magazine format. But new paper coatings, inks, and folds still are sought as these announcements vie with each other, as well as those of competing studios, for the exhibitor's eye. He is offered free supplies of "heralds" or throwaways, and urged to book and exploit the picture by means of:

Stunts (to cull a few that proved successful)

1) If your showing is based on a popular novel, hire an empty store building and fill all show windows with copies of the book.

2) Rig a giant Western Union telegram the size of your theatre facade. Print your plug in telegraphic language.

3) Hire pretty girls to ride all street cars. On the trams, girls will unfold and read long circus herald describing your current attraction.

4) Pass out quantities of bank checks, payable to "Anybody" in the amount of $1,000 worth of laughs and heart throbs. Each signed by the star of the show.

5) Early Sunday morning, hire boys to call at all homes in your city and fasten to each front doorknob a shipping tag printed as follows: "Closed. Gone to..... to see....."

6) Mail to every student graduating in your town a letter of congratulation, accompanied by a pass good for one show.

7) Cut out composition board dancing girls, full size, and set up everywhere. Award anyone who is heard conversing about the display a free pass.

8) Put the usual throwaways in all standing cars.

9) Rent a compressor and release confetti into the downtown streets. Whirl chopped paper from sound trucks.

Take any star you like, as a symbol of this peculiar art-industry's dependence on the products of the paper mills. From the day her contract is signed, thereby practically relinquishing her right to a private life, she inhabits a home which, because it is incessantly photographed for the rotogravures, must undergo frequent redecoration, each time reflecting the newest in wall paper harmonies; she works in ships and shops, mansions and hovels, built and "propped" with paper, while her professional life is nourished on bales of newsprint.

Cinema's intelligent consumption of paper yields both greater artistry and financial return.

Grinding of Machine Knives

JOHN GREENWOOD, Superintendent of Knife Dept.
E. C. Atkins and Company

EACH user of machine knives should realize that care in the sharpening and honing of knives would, in the long run, give him much better service than he is now obtaining. Knives which are properly ground will give much longer service between grindings; and, at the same time, they will provide greater production.

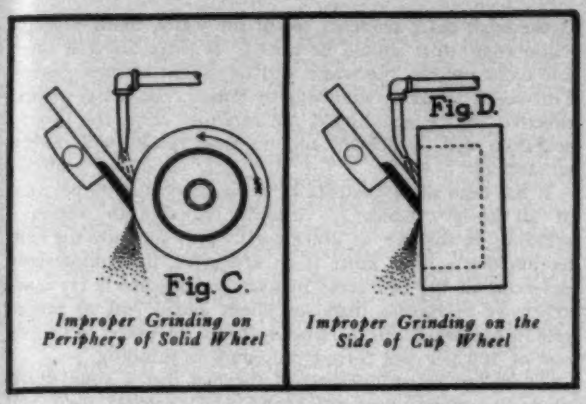
One must learn that the steel used in most carbon knives usually contains from .70 to 1.20 per cent carbon, and that in many cases, alloys are used to make them tougher, enabling them to withstand hard usage and shock. This content makes the steel very dense; in other words, the structure of the steel is very fine. Therefore, in the grinding operation, an emery wheel that is of the coarse variety cannot do an efficient job.

Proper Grinding on Periphery of Solid Wheel

Proper Grinding on the Side of Cup Wheel

The careful selection of a grinding wheel for sharpening knives is very essential; one cannot expect a wheel that is coarse and hard to do satisfactory work. For example, no one expects the head of a pin to imbed itself in a comparatively hard surface, but by turning the pin around it is a simple matter to penetrate this same surface with the point. The coarse grit wheel sharpens the edge without a doubt; however, under a microscope, the edge of the knife will show hundreds of small nicks, invisible to the naked eye. It would take many hours to hone these nicks out, causing a waste of time and labor. One of the common mistakes made by users of emery wheels is that they expect a wheel to last an inconsiderably long time, unmindful of the damage it does to their knives by reason of its hardness and coarseness. A good point to remember is that an emery wheel costs very little in comparison to the value and perfection of the work it accomplishes.

Another great disadvantage of a coarse grit stone is that it will glaze very easily and cause friction which in turn causes heat, thereby burning the extreme edge of the bevel which does all the work. A soft emery wheel with a fine grit that will imbed itself into the hard, dense structure will leave a keen edge that requires very little honing.



Improper Grinding on Periphery of Solid Wheel

Improper Grinding on the Side of Cup Wheel

As an illustration: Would anyone file a cross-cut saw with a bastard (coarse) file? This type of file would leave a serrated edge which would not last long because it is very weak. The same principle applies to the edge of a knife, regardless of what kind of knife it is, if a coarse emery wheel is used in grinding. The first impression the average grinder gets is that sharpening a knife with a fine stone will slow up production. On the contrary, it will increase production, and the knife will last longer between grindings. If there is a series of small nicks, caused by grinding with a coarse stone, even though they are invisible to the naked eye, in the cutting edge when the knife is put to use, the small nicks break out, becoming larger nicks; consequently, this is the cause of much of the difficulty in cutting. If there were no nicks to begin with, the knife would stand up longer without becoming dull.

Experience has proved that for fast cutting, with a minimum of trouble, a wheel from a 60 grit, I grade to an 80 grit, I grade is the most suitable. A wheel coarser than a 60 grit is never as satisfactory as the fine grit. Anything coarser is not recommended. The 80 grit, I grade has been proved very suitable for sharpening all knives used in the paper industry. In some cases, knife grinders are using an even finer stone than an 80 grit, I grade. However, this grade is advocated only where the bearings of the wheel are tight and where the spindle does not vibrate. If the machine does have these faults, it might be advisable to use a wheel which is a grade harder than I grade.

It has been suggested that, whenever possible, it is better to use a segment wheel rather than the solid type wheel. The segment wheel has open spaces which help greatly in keeping the wheel open. It is also recommended that a cup wheel be used in preference to a straight type wheel for the reason that a cup wheel grinds a straight, flat bevel, whereas a straight type wheel, which grinds on the periphery, makes a hollow or concave bevel. The hollow bevel weakens the extreme cutting edge and does not stand up in comparison to the flat bevel.

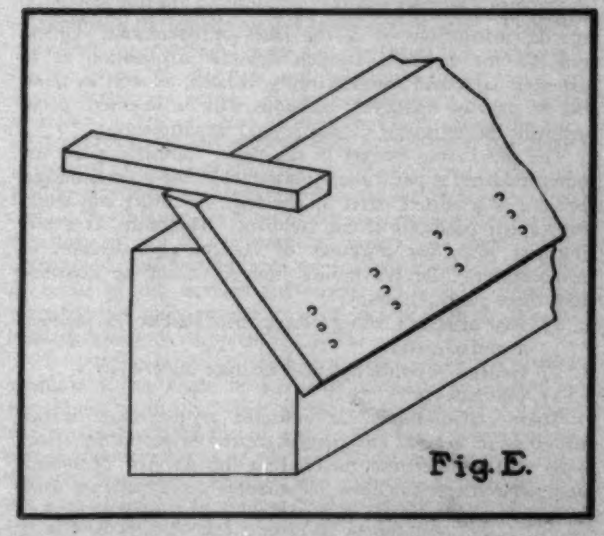
It is most essential that wheel bearings are as tight as possible and that the wheel runs true after being mounted. Many emery wheels wear away quickly because of vibration in some types of machines. The wheel must be kept true while grinding with the use of a dressing tool. Experience has proved a Huntington type dresser to be most satisfactory. Some grinders still insist on using a brick for an opening-up stone; a brick may true a wheel, but, at the same time, it has a tendency to clog it up. The Huntington type dresser will open up the stone, causing it to cut freely.

The question of whether the grinding of knives is done better wet or dry has been much debated. Both methods have their merits. It is generally agreed, however, that wet grinding, in order to be successful must make use of a large amount of water. Most machines are equipped with water attachments; but some of these do not provide sufficient quantities. The water must prevent the knife from getting hot while not cooling it too quickly after it is hot. In order to do this, a large stream of water must be provided. It should be directed at the point where the heat is being generated, namely, at the point of contact between the wheel and the work, not on the work after it leaves the wheel.

A small amount of water allows the knife to heat up; then it cools the knife after it leaves the wheel. This is the direct cause of much of the knife trouble experienced. One method of overcoming, to a certain extent, the inadequate supply of water furnished by some machines is by creating a little dam, made of putty or clay, at either end of the knife where it projects above the table of the machine. A reservoir will be formed between the knife and the carriage. This will fill with water, and will keep the knife cooler than a small stream of water running over a limited space will. One must understand, however, that this method can be used only where knives are ground with the bevel side up.

There are many different kinds of grinding machines used today in sharpening knives. The type shown in Figures C and D is being used very prominently. This type is absolutely contrary to that advocated by E. C. Atkins and Company. There are many reasons for not grinding with the cutting edge of the knife down. The operator cannot see what he is grinding. If any heat is generated in grinding, it will do the most harm where the knife is the thinnest—at the extreme cutting edge. Knives, for the most part, are made with a soft steel backing. When grinding on the type of machine shown above, the emery wheel cuts the soft part of the bevel first. Then it carries this material past the dense structure of the tool steel which is the most essential part of the knife. This helps to clog the wheel and to start the glazing and burning action. The result is that when a dresser is used to open up the wheel, it wears the wheel away much faster than one might suspect. If a coolant is used when grinding on this type of machine, the part of the knife that needs the most gets the least; if the knife gets hot, what little coolant comes in contact with the edge causes minute cracks, hardly discernible to the naked eye. However, even if the cracks are very small, they will enlarge when the knife is put to use, and, almost inevitably, pieces will break out of the edge of the knife. It may be surprising to learn that this fault causes more trouble than any other in knife grinding.

The method recommended by E. C. Atkins and Company for sharpening knives is illustrated in Figures A and B. High speed and thin knives can be successfully ground without water or coolant; however, the proper grit and grade of



grinding wheel must be used. Hardened and tempered carbon steel knives should be ground wet in order to obtain satisfactory results. If the latter are ground dry, the temper is very apt to be destroyed.

After such knives as paper knives and veneer knives are ground, they should be honed very thoroughly. By using a fine, soft grit wheel in the grinding operation, the honing time can be cut to a minimum. A knife that is carefully and properly ground and honed will give much longer life and much more satisfactory service in every way. An 8-inch Indian oil stone can be used to good advantage; the better the hone used, the more economical and satisfastory it is in the long run.

Place the knife on a block at the proper angle as shown in Figure E and hone with a circular motion. It must be emphasized that one cannot be too careful in this operation. Every bit of "wire burr" must be removed from the cutting edge. A good way to do this is to pass the hone underneath, on the face side of the knife, being very careful not to "dub" this side of the cutting edge. One way to determine whether all of the "wire edge" or "burr" has been removed is to draw a handful of cotton waste along the edge of the knife. If the edge has a tendency to cut the waste, there is still a "wire edge" that should be honed. If there are still some fine nicks present, the waste will be caught at these places. This seems rather a crude way of testing, but it has proved effective. If the grinding is not carefully done, the honing operation will be difficult and the final results will not be satisfactory.

It has been the experience of many users that 90 per cent of all knife troubles are directly traceable to improper grinding on the part of knife users. This supports the contention that a good knife is an expensive, finely-made tool deserving of the best care; that any good knife is far more expensive to replace than any slight added cost in proper grinding wheels, careful workmanship, or other incidental cost of 100 per cent correct procedure in grinding.

There can be no question of the fact that a good knife, properly ground, properly honed, and correctly used will give twice the life, and twice the output of a poorly-ground, abused knife—no matter how good it was to start with.

So, for your own benefit, for your own profit, and for your own freedom from knife troubles, give earnest consideration to these facts on grinding.

Spending for Equipment and Supplies

T. E. BRUNING, Auditor
Oxford Paper Company

UNSETTLED general conditions since 1929, with the many resulting changes in company policies and financial programs, have led to a constant demand for simplification of budget procedure to curtail expense and to provide quickly required data from which to determine amounts available for investment in plant and inventory. To secure the necessary information economically one must depend largely upon the elimination of unnecessary detail and clear, specific instructions as to the basis of operations. Unless requests for estimates contain definite information as to expected sales and manufacturing volume, as well as number of days of operation, revisions will be required to coordinate the estimates of the several departments.

The purchasing budget in the paper industry, as in any other industry, is particularly important to the general budget because of its direct effect on the cash, inventory and working capital positions of the company. Therefore, as a preliminary step, for purposes of control and division of responsibility, the purchasing budget should be classified into three general groups:

1) Raw materials, being a component part of the products manufactured;
2) General supplies and maintenance materials;
3) Equipment.

These classifications are desirable as purchases of raw materials in general are directly related to production; supplies and maintenance material to the days of operation; and, equipment purchases to amounts tentatively set aside by the management for that particular purpose.

Estimates with reference to expenditures, with the exception of pulpwood and large plant and equipment items, are prepared by the purchasing department and based upon monthly production, expressed in tons of paper and pulp, as furnished in instructions received from management. Pulpwood estimates are compiled by the wood department and expenditures for plant and equipment by the engineering department. In the case of a small organization, it is expected that the purchasing department would prepare all estimates.

With regard to raw materials (pulpwood excepted), the value of each material is readily determined by the application of a simple formula to the production figures. The value of each material entering into the manufacture of a ton of finished paper is obtained from statistical reports and this value multiplied by number of tons to be produced gives estimated total usage. This principle is applied to conversion items, such as coal, felts, and wires, as well. Each material is listed separately, month by month, the budget showing cost and freight charges in individual columns. Explanatory notes are made of any marked variations from average which may be attributed to alter contract or market prices; increases or decreases in inventory due to market conditions; as well as contingencies. In the latter category may be included price trends (in general or specifically) and freight rate changes. These budget notes are supplemented from time to time, as occasion demands, by letters to the interested executives, advising of actual, threatening or imminent changes affecting the budget as prepared.

Arrangements for the purchase of pulpwood are made in the early spring and, immediately prior to that time, a special forecast is set up by the sales and manufacturing

departments so that the wood requirements of the mill to October of the ensuing year may be determined. The forecast of tonnage is converted into pulpwood by species, based on statistical information, and purchase requirements are determined after taking into consideration current inventory position as well as the required inventory position at the end of the period. Wood requirements are then covered by contracts or company operations and the budget for wood expenditures is prepared on the basis of contractual obligations, shipping schedules and the requirements of the company's woods operations. Once established and under way, little can be done with reference to changing the cash requirements for pulpwood. Therefore, the seasonal schedule of the wood department is the working basis for the periodic financial and expenditure forecast, adjusted to conform to the regular budget period.

The estimate for the purchase of general supplies and maintenance materials requisitioned by and distributed through the mill storeroom is lumped into one item under the heading of general supplies and maintenance materials due to the fact that the individual items are innumerable, usage is variable, and an attempt to break down the figure would result in an expense not justified by the result. It has been found by experience that a combination of average daily costs over a period of six months or more will give an amount satisfactory for budget purposes.

Expenditures for plant and equipment originate with the mill management, through the engineering department, and such expenditures are budgeted under capital jobs, being limited in total to amounts provided for that purpose by the general management. In the case of each individual capital job a report is submitted by the engineering department, signed by the executives and department supervisors, suggesting the purchase and indicating the reason for the recommendation, that is, increased efficiency of operation, savings in costs or replacement of wornout equipment. The proposed expenditure is then discussed in conference and, if approved by the mill management, is submitted to the board of directors. The engineering department prepares all estimates of expenditures for the ensuing budget period, taking into consideration all authorized jobs as well as any work contemplated but not yet submitted for approval. The schedule submitted indicate the amounts to be expended for each job and the total is then summarized to show expenditures by months under the subjects "labor" and "materials." This schedule is subject to consideration by the general management but approval is withheld until the general budget has been completed and accepted.

The general financial budget consists of income and expense accounts, cash receipts and expenditures, and monthly balance sheets and, obviously, the purchasing budget, which is only one of the several estimates required to prepare the general budget, must be in conformity with the forecast as a whole. Frequently, when all statements are completed, errors in judgment are revealed and policy changes are found necessary. Through an examination of the projected monthly balance sheets, particularly concerning inventories and accounts payable, trends will be noticed which may call for curtailment of inventory, plant or other corporate expenditures, in order to protect the cash and working capital position of the company. It is only after due consideration is given to all of these factors and necessary adjustments have been made that it can be said the budget has been accepted and funds allocated to the purposes as set forth. It must be borne in mind that the allocations, with the exception of plant, are more in theory than actual as it is deemed neither practical nor prudent to attempt to definitely limit purchases to forecast amounts. In actual practice, variations in operations and products and changes in general business conditions, as well as other contingencies, must be taken care of in the normal course of business. It therefore follows that raw material purchases, with the exception of pulpwood, should fluctuate in approximately the same ratio from forecasts as volume of production, whereas general supplies and maintenance materials will follow the ratio of operating days.

There must be close cooperation at all times, of course, between the purchasing and manufacturing departments and they, in turn, must work with the management in order to achieve the results indicated by the budget. Unless sufficient advance notice is given in connection with changes in operations or products, commitments for materials or supplies may be continued which might otherwise be cancelled. It is essential, therefore, that at all times current information be exchanged respecting usages, inventories and commitments to insure timely, intelligent action by all parties concerned.

Budget enforcement is a matter requiring careful consideration and much has been written outlining methods by which actual performance can be measured. From a practical standpoint, a simple method is to compare monthly the actual inventory position of the principal raw materials with the inventory position as contemplated by the budget and, if in substantial accord, it is evidence that purchases are in line with estimate and actual usage. To be sure, material usage may be high or low and, while the purchasing department should make inquiry concerning any variances for its future guidance, the responsibility for and explanation of such differences rests with the manufacturing department and it will be necessary for that department to justify results.

A report showing estimated and actual inventory position of the various principal commodities and supply items is prepared each month and detailed comments attached explaining fully the reason for all large variances. Such reasons may be: decreased usage because of change in manufacturing procedure; reduced volume of sales of product in which the particular item is used; or, over-buying because of a favorable market. This information enables management to take steps necessary to realize on materials no longer in use, by sale or substitution, as well as protect their manufacturing operations against material shortage or price fluctuations. Beyond the point of determining that the inventory position is in accord with estimate, it is believed that a comparison of actual and budgeted purchases is of no practical value.

In the case of plant and equipment purchases, under the job system regular monthly reports are prepared indicating expenditures during the current month and to date. Amounts expended are compared with the appropriation authorized by the board of directors and any under-expenditures or over-expenditures noted. An over-expenditure, if in excess of normal tolerance, must be explained fully when the particular job has been completed and, at that time, the excess is covered by the authorization of an additional appropriation by the board of directors. All jobs are followed closely and, in the internal working of the engineering department, expenditures to date are compiled weekly. As soon as it is determined that expenditures on an individual job will be in excess of the amount authorized, authority is obtained from the mill management to incur such additional expenditures necessary to complete the work.

The purchasing budget should always receive the careful attention of the official in charge of purchases because of its importance to the activities of the corporation as a whole, and it will be found that if approached in a common sense manner the preparation of the purchasing budget; co-ordination with the general forecast; and enforcement, will involve but a small amount of time and effect economies in purchasing as well as improved control of inventories.

WATER:

A Raw Material for the Paper Industry

PART I—PROCESS WATER

R. T. SHEEN[1] and H. M. WILSON[2]

THE position of water as a raw material in the paper industry has never before received the consideration and study that it is receiving today. The formation of technical committees by TAPPI for the establishment of industrial water specifications and the increased number of papers on this subject are mute evidence of the growing realization that this material called "water" is more than a mere convenience—it is an important raw material and must be studied and used as such.

In practically every industry the ability to obtain a proper water supply is important, but it is of prime importance in the case of the paper industry. As such, the water supply should be studied considering the water requirements of the plant as to volume, temperature, variation in quality with seasons, and seasonal fluctuation in as far as the supply is affected. While by far the greatest use for water will be in the manufacture of the paper, the other uses for water in the plant must be considered. Water is required for cooling bearings, turbine condensers and for boiler feed purposes, in addition to any domestic requirements that may or may not be obtained from the same source.

It is impossible to establish standard specifications for a water for paper making without first specifying the kind and grade of paper that is to be manufactured. The requirements for a boxboard mill as obviously different and not as strict as the water requirements for high grade specialties such as photographic papers. H. C. Schwalbe (*1*) recently presented, as a basis for discussion at a recent meeting of TAPPI, a proposed table of standards as follows:

	Proposed Standard for Higher Grade Products		Permissible Tolerance for Lower Grade Products	
Turbidity	5	ppm	25	ppm
Color	5		15	
pH	7.0		6.7—7.3	
Residual chlorine	0.3	ppm	0.8	ppm
Total dissolved solids	75	ppm	150	ppm
Mineral solids	80	ppm	200	ppm
Hardness	Up to 100	ppm	200	ppm
Potassium permanganate test	10	ppm	20	ppm
Iron as Fe	0.05 to 0.1	ppm	0.2	ppm
Manganese as Mn	0.05	ppm	0.1	ppm

The method of obtaining a water to comply with these standards, a discussion of these standards, and the correlation of the water treatment that may be required with the engineering of the plant as a whole, will be considered.

Sources of Water

There are some few mills that obtain their water entirely from a municipality or from an outside treated water source. The number of these is comparatively small, and for the most part, such waters do not require further treatment except in cases where unusually high standards are required or where it might prove advantageous to employ softening or pH correction before being used in process. Some municipalities are not too particular about the complete removal of iron from the delivered water, therefore, in no case should it be taken for granted simply because a water supply may be from a treated water source that it will be fully satisfactory for the operation. A check should be made on the water that is available, and into the history of the variations that can be expected at different seasons of the year.

Well waters form the principal source of supply for many plants. The mineral content of a well water will as a rule remain fairly constant. This is particularly true with the deeper wells. Water taken from such wells may be sparkling and clear when first sampled. After standing for a period of time, however, iron is frequently observed precipitating from solution. Iron present in well supplies is found in the bicarbonate form, as ferrous bicarbonate [$Fe(HCO_3)_2$]. Manganese is also sometimes present and is not as easily removed as iron. Aeration followed by filtration is usually sufficient for fairly satisfactory iron removal, although in other cases some lime treatment with the aeration is desirable. Aeration is also of value in oxidizing dissolved organic matter.

Because of the large amounts of water required in pulp and paper making most mills are located on or near rivers or streams. The widest variation of both suspended and dissolved solids content can be expected in such a supply and the possibility of both present and future pollution of the supply must be considered.

ADVANTAGES OF CLOSED WATER SYSTEMS

Before any discussion is given of the methods of treatment, it is well to consider the water system from the engineering standpoint, that is the study of the advisability of making a system as nearly closed as possible. It is obvious that this will directly affect not only the size of any water purification plant but also the design and one cannot be studied without considering the other. Figure I illustrates a typical water circulation diagram for a paper mill incorporating a number of the points that will be discussed in obtaining a closed type of system. The advantages of a closed system may be briefly summarized as follows:

Conservation of Heat

Some preliminary heating of the white water is commonly practiced and it is obvious that the temperature of the stock to the machine will have a direct bearing on the amount of steam required in the machine. Where white water is overflowing to the tail race, a certain amount of heat is carried with it. It is possible to make an approxima-

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(2) H. M. Wilson Company, Consulting Engineers, Philadelphia, Pa.

tion of this loss by means of a simple calculation as follows:

$$\frac{(\text{gal./hr. to tail race}) \times 8.34 \times (T_1 - T_2)}{1{,}000} = \text{lb. steam lost per hr.}$$

Where T_1 — temperature in degrees Fahr. of water leaving mill to tail race.

T_2 — temperature of incoming water to mill.

1,000 — approximate B.t.u. available per pound of steam.

For example, in one recent survey where the advantages of installing a closed system were studied, 8,000 g.p.h. were overflowing to the tail race at a temperature of 120 deg. with the incoming water at 67 deg. Substituting in the formula the heat loss was equivalent to 3,535 pounds of steam per hour for 85,000 pounds of steam per day.

It is frequently possible to recover heat by various methods. Raw water that may be taken directly to the bearings on the calenders, jordans, suction and press rolls possibly may be returned to the water treatment system for conditioning. Detailed treatment is not usually required prior to this use other than coarse filtration unless such water is recovered for process purposes. The quantity of water used in the average mill is usually sufficient to condense that portion of the steam passed to the turbo-generator for producing power over and above that which can be produced by the process steam available. This application has contributed materially to the successful development of the "topping" idea in paper power-plant installations.

Where it is desirable to heat the water, it usually will not prove economical to use steam directly in the beaters, especially if exhaust steam is available. Such exhaust steam frequently can be obtained from turbines and reciprocating engines, and where it is oil contaminated, it can be used by passing through heat exchangers to obtain the proper temperature.

Reduction of Pretreatment of Raw Water

It is obvious that the more nearly a system can be closed, the smaller the plant that will be required for pretreatment of raw water. The percentage of raw water that is introduced into the system as a part of the whole can be considered in setting the standards of the raw water required. Inasmuch as the size of a water plant will frequently influence the method of treatment, the question of determining proper size is of prime importance. With a smaller raw water treatment plant, lesser quantities of chemicals are required frequently effecting material savings.

Reduction of Industrial Waste Disposal

Many states such as Pennsylvania, Illinois, New Jersey, and others, are forcing industries to eliminate or reduce the pollution load on the streams, and the question of industrial waste disposal is therefore one of prime importance. This problem applied to the paper industry cannot be treated in full in this article but only the problem of plant design, which is considered from the viewpoint of reducing to a minimum industrial waste so that not only present laws but laws that may be passed in the future can be met without complete re-design of the plant.

The principle waste from the paper mill is overflow white water. The white water normally can be considered as originating in the thickener system, from the machines, etc., with the various subdivisions. Various methods are in common use for recovery of pulp from the white water. The first removal of pulp, removing the coarser fibers usually is accomplished by sloping screens such as the hillside, following which pulp may be removed in settling tanks similar to the Hardinge type or the white water may go direct to a save-all such as the Bird consisting of screens or the Adka (3) Figure II). The Adka Save-all, though relatively new in this country was originally developed in Europe, it consists of removing fiber by first mixing the white water with alum and air in such a way as to float the fiber stock. The fiber stock is then removed by skimming and is returned to process. The clarified water may then be wasted without objection. This system has proved successful in a number of cases and is one answer to the question of waste disposal.

Still another method of handling the waste white water is to introduce it as part of the make-up water to the raw water treatment system after it has passed through screens and settling tanks. This method, of course, can be used only where a raw water treatment system is employed. One plant now is being designed by the author where the total water requirements of the treatment plant are 900 g.p.m. of which 250 g.p.m. will be recirculated white water taken from the save-all screens and 650 g.p.m. will be river water. While the coagulant requirement of the raw water treatment plant will be increased by introduction of the white water, a completely closed system will be obtained with no liquid dumped to the stream—the sludge from the treatment plant being fed to vacuum filters, and the liquid filtrate reintroduced into the system. It will be noted that no fiber recovery is available with such a system, as the fiber is removed with the coagulated solids from the raw water supply, but clarification of the white water is effected.

If a portion of the re-circulated water is not used for other purposes and not returned to the system thus providing a bleed on an entirely closed system, some form of bleed or dumping may be required at infrequent intervals to relieve concentrations of soluble solids. By use of a closed water system, it has been possible to reduce the raw water requirement considerably in many mills. In one board mill, for example, with which the authors are familiar, this requirement is below 1,000 gallons per ton of board including a periodic dumping of the system, and on this same mill, 384 gallons of the 1,000 gallons is loss of water due to evaporation per ton of board from the sheet.

The accompanying table illustrates the analysis of a raw river water and a white water in a typical board mill. This particular white water is on a low grade stock and the color is quite high. Proper clarification and treatment of a raw river water of the type shown to give a clear water fit for high grade products presents a detailed problem.

Methods of Treatment—Suspended Solids Removal

Where suspended solids are high in the raw supply, color is also frequently present, and the removal of color is usually accomplished by the same operation as the removal of the suspended solids, although the method of treatment for removal of the suspended solids is frequently affected by the degree or amount of color that must be eliminated. Assuming that the raw water is obtained from a stream or a river, a bar screen or a mechanical trash screen may be employed at the intake to prevent large twigs leaves or fish from entering the system. Frequently a large portion of the suspended solids may be removed by plain subsidence and where the space is available, the use of subsidence will be found to materially lower the quantity of coagulants required for proper treatment. Where white water is to be re-circulated into the system, and a subsidence basin is used, the white water can best be introduced with the incoming raw water at the inlet to the subsidence tank. The length of time for subsidence is highly variable and must be dictated by a study of the individual plant conditions, and if it is to be used, may vary as little as one-half hour to as long as 12 to 24 hours.

The water from the subsidence tank or in many cases the raw water as taken from the source of supply will then be

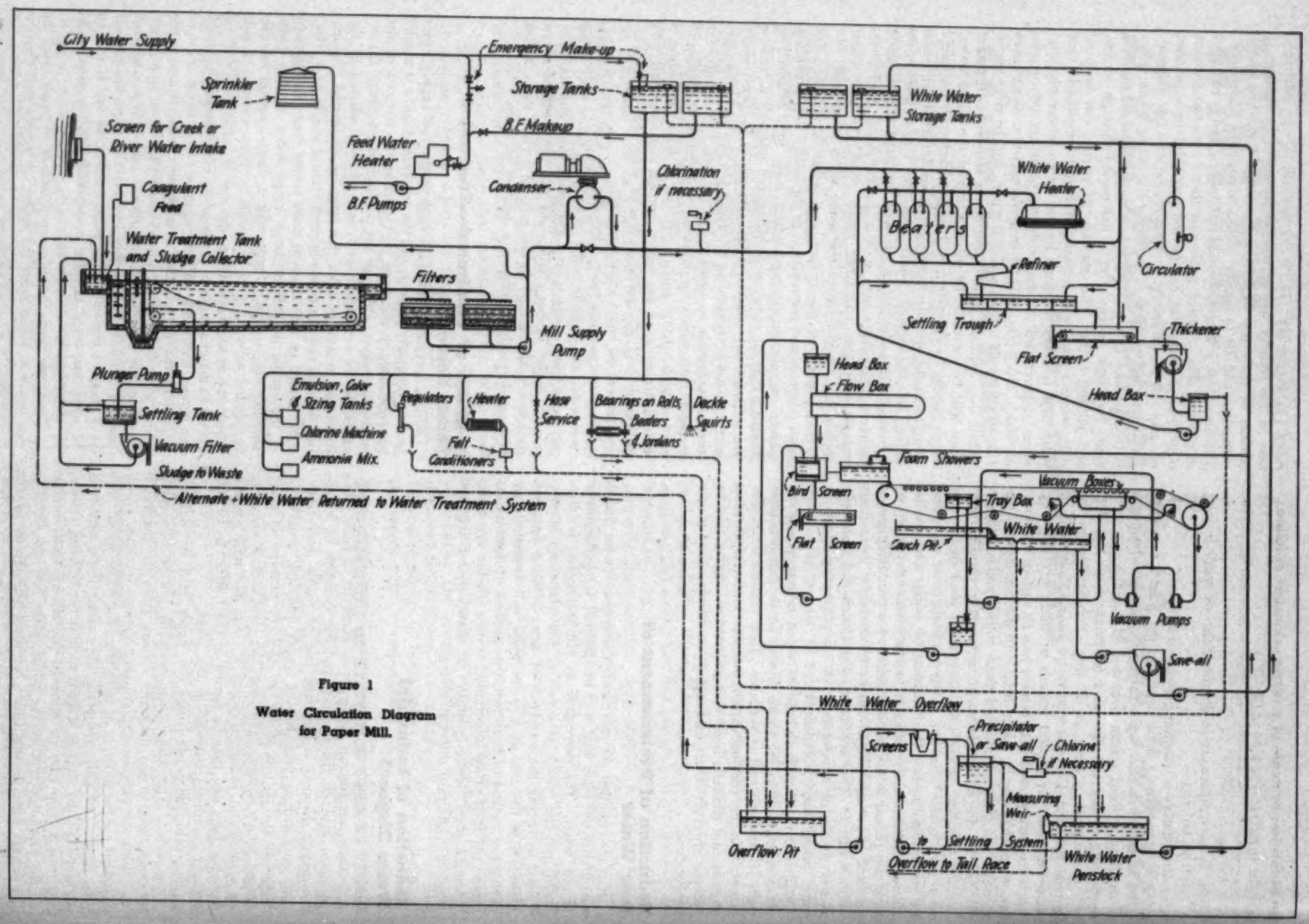

Figure 1

Water Circulation Diagram for Paper Mill.

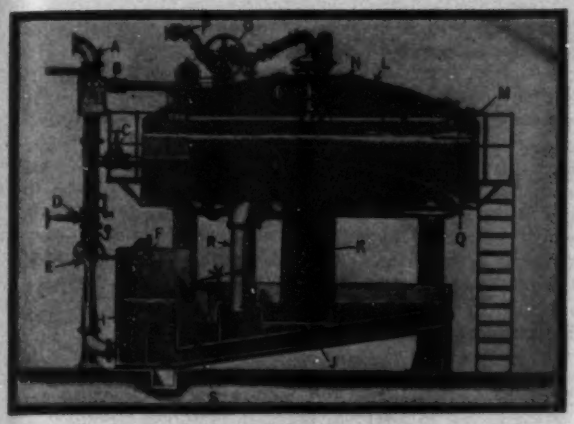

Figure 2—ADKA Save-all.

treated by the addition of a coagulant such as an aluminum salt or a ferrous or ferric salt. The pH range, the characteristics of the suspended matter and the quantities of dissolved materials together with the purpose for which the water is to be used will dictate the coagulant that should be employed. A coagulant acts to gather together the finely divided particles that would not be removed by normal settling without an excessive retention time, and forms particles of sufficient size, enmashing the finely divided and colloidal particles, so that rapid settling is effected.

The proper formation of the floc is of extreme importance and, in most cases might be said to be the heart of the water treating plant. The larger the floc particles that are formed, the less will be the time required for proper settling and the lighter will be the load on the filters following the settling. At one time it was the practice to add the coagulant to the water as it entered a basin, mixing carefully by such devices as hydraulic jumps, round-the-end baffles, etc., but present day practice is distinctly to use mechanical flocculators which are so designed as to give the water a rolling motion just following the addition of the coagulant. This motion is of sufficient velocity so that the water is turned over a number of times but at the same time not of sufficient velocity as to tear the floc that has been formed. The coagulant together with any chemicals that may be added for pH adjustment is usually fed either by dry chemical feeders or solution feeders controlled from an orifice or from a meter in the main supply line. Following the mixing basin, the water is introduced to the settling basin where the floc that has formed is settled. The sludge from the mixing basin may be removed either by lateral piping or by various mechanical devices such as chain belts or thickeners. Material progress has been made in the past few years on efficient design of settling basins.

One unit that has recently been put into practice, known as a Spaulding Precipitator, *(4)* introduces the raw water mixed with a coagulant into the outside section of a large circular tank where it is slowly agitated by a revolving arm, flowing down to the bottom of the tank and mixing intimately with the sludge that has formed. The water then flows upward through a conical section through its sludge blanket to the settled water overflow. A portion of the sludge is continuously extracted from the system. By employing the principle of forcing the water through its own sludge blanket, exceptionally large floc size is obtained, and it is claimed that a unit of this kind will give an effluent water with a retention period of one hour equivalent to what can be obtained in a normal settling tank after six hours subsidence.

From the settling unit, the water passes to the filters which may be either gravity or pressure type, depending on the levels and heads, etc., that can be obtained. Gravity filtration is usually preferable to pressure filtration due to the ease of which the filtration operation and the conditions of the filters may be observed. In either event, however, the normal head from the settling tank to the filters should be employed without passing the water through a pump as mechanical agitation of the water prior to filtration would tear any floc that would pass on to the filters and render filtration more difficult. Filters may be built with sand, calcite, anthracite coal or magnetite and filtration rates of two to three gallons per square foot of filter area per minute are considered good practice. Control devices are available for regulating the rate of flow through a filter, and if multiple filters are used, good design dictates the ability to carry the load on the remaining filters when one filter is out of service for backwash purposes. From the filters, the water may pass to the clear well or be pumped to storage, and in designing the storage capacity, proper capacity should be allowed to permit backwash of the filters, although in some cases they may be backwashed directly from the settling tank. In the case of some raw water supplies, filtration with coagulation but without pre-settling may be employed.

Other Methods of Treatment

Chlorination or the use of chloramine is frequently desirable in the water treatment system, applying at one of three points, or possibly in some cases at all three. The most necessary point of application is to the water coming from the filters to the clear water storage for all water being used in actual papermaking. Chlorination prior to filtration frequently will give longer filter runs and may be justified from this standpoint. If chlorination is employed with coagulation, larger amounts of chlorine are required, but frequently the removal of color and iron will be more complete. This is a problem that requires individual study.

The question of whether softening should be employed for process water is also a problem individual to the mill.

Water Analysis of Typical Board Mill

		Raw River	White Water
PARTS PER MILLION	Turbidity as SIO_2	450	770
	Suspended matter	Present	Present
	Carbonate Hardness (as $CaCo_3$)		
	Non-Carbonate Hardness (as $CaCo_3$)		
	Total Hardness (as $CaCo_3$)	228	216
	Sulphates (SO_4)	128	136
	Chlorides (Cl)	12.5	23
	Iron (Fe)	25	9.0
	Free Carbon Dioxide (CO_2)	8.8	
	Bicarbonates (as $CaCO_3$)	137	173
	Carbonates (as $CaCO_3$)	0	0
	Hydrates (as $CaCO_3$)	0	0
	pH Value	7.1	7.3
	Sulphate Chloride Ratio (SO_4/Cl)		
	Sulphate Carbonate Ratio (Na_2SO_4/Na_2CO_3)		
	Percent Blow Down		
	Oil		
	Oxygen consumed as O	49.2	89.0
	Color	100	232
	Total Solids	582	1090
	Suspended Solids	232	501
	Silica as SiO_2	9	16
	Nitrate as NO_3	17.7	
	Organic	102	

Soft water is desirable in washing pulp when working with either sulphite pulp or soda pulp, as the calcium and magnesium salts present in hard waters may deposit with the pulp, making bleaching more difficult. Hard water frequently will interfere with a dyeing operation. Where sizing is employed, soft waters are desirable. It is possible in some cases to eliminate this objection to hard water by a study of the colloidal properties and the possible introduction of protective colloids. There are other requirements in papermaking where hard waters cause no difficulty whatsoever and in some sections relatively high grades of paper are made with very hard water. Where softening is desirable, lime often can be used in conjunction with the coagulation and settling practice.

The final pH value of the water from the treatment plant may require some adjustment before the water is finally used. Where it is desirable to lower the pH value, re-carbonation may be employed, introducing free carbon dioxide to neutralize a portion of the alkalinity. Where more alkalinity is desired or higher pH values are required, the use of lime or soda ash is dictated. As a rule, the pH value of the water should be carried fairly close to the neutral point although some deviation may be dictated in accordance with the content of other solids present.

It is now possible to calculate whether or not the water is supersaturated with respect to calcium carbonate and whether deposition of calcium carbonate can be expected in a given system. This calculation can be made from the calcium concentration, the alkalinity concentration, the total dissolved solids content and the temperatue that would be maintained. The method for making this calculation is fully explained by Langelier *(2)*.

Manganese in a water supply frequently will prove troublesome, oxidizing and forming black spots in the stock. Manganese can be removed by precipitation at higher pH values, usually above 9.2, or by treatment with a "magno" type of filter.

Iron removal should be as complete as possible. Chlorination will frequently aid in precipitation of iron and removal in the coagulation process. Coagulation and higher pH values will eliminate iron from the system. While Schwalbe has given a proposed standard of 0.05 to 0.1 ppm, the authors know of one case where the iron had to be limited to not more than 0.01 ppm. It also should be remembered that complete removal of iron in the treatment plant will be of little value if the water from the treatment plant is corrosive in characteristic and will bring iron into solution from the piping and equipment and carry this iron through to the process. Dissolved organic matter which frequently imparts color to water may be partially removed by the use of activated carbon incorporated in the coagulation process.

Summary

There are many phases of this problem which it is impossible to cover in complete detail in a dissertation of this type. The science of water treatment has made material strides in the past few years and the services of competent engineers to evaluate a given problem, correlating the mechanical side of plant efficiency and the chemical engineering side of the proper water supply will be found to be of considerable value. There is no cure-all or one system of treatment that is applicable in all cases. Such services frequently can be employed at a material advantage to assure the successful manufacturer that he will obtain the most economical water plant installation of the type that will produce a water exactly suited to his requirements.

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This article is in two parts. Part II will be published in an early issue of this magazine.—*Editor's Note.*

CREATIVE FORESTRY*

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INTEREST in forestry has gained tremendous impetus in recent years. Although the reasons for this increased interest are many and varied, the realization that vast areas of nonproductive land in the United States must be kept from further degradation and should be put back into production as soon as possible, is probably not only one of the most important but also is a sound basis upon which this interest can be maintained. This expansion of forestry activity has brought home more than ever the realization that forestry itself is a very young profession and that exact technical information is very limited. This is particularly true in respect to our knowledge of the forester's "stock in trade"—forest trees. The raw materials of the forester are still the native trees of the forest. Practically nothing is known of the genetic nature of these trees or of the adaptability of exotic species, strains or races, and work has only recently been started to obtain improved forest tree types. In this respect, forestry is still far behind agriculture and horticulture, but there is evidence that this phase of forest research is slowly but surely gaining recognition.

(*) Presented before the Midland Section (Michigan) of the American Chemical Society on February 22, 1938.

Increasing Emphasis on Forest Tree Improvement

In 1924, when the author started to work on the poplar breeding project of the Oxford Paper Company, under the direction of Doctor A. B. Stout, there was no other large-scale project with improvement of forest trees as its primary or sole objective under way in the United States. In 1925, the Eddy Tree Breeding Institute was established for the improvement of pine, and today this is part of the California Forest and Range Experiment Station. More recently, the

Bureau of Plant Industry embarked upon an extensive chestnut breeding program for the development of disease-resistant forest types. In 1935, the Forestry Division of the Tennessee Valley Authority started forest tree breeding work and in the fall of 1936 the forest genetics project was initiated at the Northeastern Forest Experiment Station. From a tangible start of one breeding project employing one technical forester in 1924, forest tree improvement is now the objective of at least four major projects employing ten technical foresters or geneticists with facilitating non-technical personnel—slow progress, but withal a healthy development which, in the opinion of the author, will go far to raise forest genetics to its place in the sun.

Improvement Methods

The steps involved in the improvement of forest trees will be much the same as those involved in the improvement of our agricultural and horticultural plants, the beginnings of which undoubtedly antedate all written history. The improvement of forest trees would appear to be more closely analogous to the improvement of horticultural trees than to improvement of annual agricultural crops. Therefore, it may be of interest to trace briefly the probable steps in the improvement of our fruit trees.

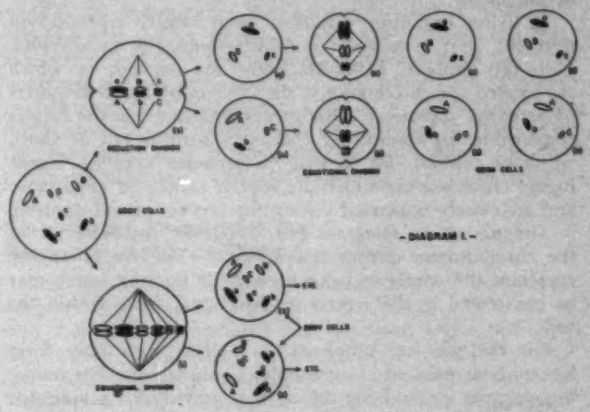
It is reasonable to believe that man domesticated fruit trees somewhat later than annual plants such as wheat and rye, if for no other reason than the assumption that nomadic individuals would hardly plant trees that required a number of years to mature. The first step toward improvement may well have been the collection of seed from desirable fruit trees by wandering individuals or tribes for planting in places to which they hoped eventually to return. With the development of commerce, interchange of such materials probably became more common, and this first step toward improvement, exploration and introduction of new types thus became, and in fact still remains, an important improvement tool.

As men began to grow their trees in groups and became more familiar with their characteristics, they must soon have realized that there were differences in the productive capacities and in the quality of the fruits of individual trees in these orchards. Reproduction of fruit trees from seed was probably the common practice of ancient people rather than vegetative propagation, at least for all but the most easily propagated types. Such seedling orchards would naturally show considerable variation and in the selection of seed for further propagation the growers undoubtedly favored the best trees. Natural hybridization between races or species, bud sports and mutations, undoubtedly added new types and resulted in wider diversification with greater opportunities for selection. This continual selection of the best stocks—mass selection over the ages—may be considered as the second step in improvement.

Deliberate hybridization and breeding, even as an art, is of comparatively recent origin; scientific breeding may be considered a product of the present century. But the earliest breeders and hybridists had received a legacy of fruit types that already had been highly improved. In this respect, they were possibly more fortunate than forest tree breeders today whose raw materials may be compared to the wild fruits sampled by the wanderers of long ago.

As growers become sufficiently familiar with their plant materials to recognize very slight differences, selections become more productive of improvement. Horticulturists in recent years have recognized rather frequent variation between the fruit on different branches of the same tree. The selection and vegetative propagation of these so-called bud sports is a refinement which is hardly applicable to forest tree improvement at the present time.

Although forest tree improvement must start with unimproved wild types, work along the lines indicated above can proceed simultaneously. Exploration for the discovery of excellent wildlings, tests of exotics, and mass selection applied to the natural forests that should never be cut and replanted will require years of patient effort. Selective



breeding within races or strains can be directed toward the intensification and combination of desirable characteristics. Hybridization between races may produce types with new characteristics or may be directed toward the combination of the excellent qualities of different races. Hybridization between species of forest trees offers exceptional possibilities because of the large amount of untried material available.

Hybridization—Creative Forestry

The fact that hybrids are often more vigorous than either of their parents is of particular importance to the forest tree breeder. This so-called hybrid vigor can be utilized immediately if the hybrid can be propagated vegetatively. Hybridization not only makes possible the combination of characteristics of different species in one new type, but may also result in the appearance of entirely new characteristics, due to combinations of germ plasm which would never, under natural conditions, be combined in one individual.

Table 1—(From Chowdhury, 1931)

Characters of Hybrid	Hybrid Favors		
	Female Parent	Male Parent	Intermediate
Longitudinal resin canals	.....	X	.....
Horizontal resin canals	X	.....	.....
Fusiform rays	X	.....	.....
Linear rays	X	.....	.....
Tracheid length (springwood)	X	.....	.....
Tracheid length (summerwood)	.....	.....	X
Tangential diameter of tracheids	.....	.....	X
Thickness of tracheid walls	.....	.....	X
Striations on tracheid walls	X	.....	.....

Improvement by hybridization and breeding depends upon the fact that each parent passes on certain of its characteristics to its offspring. A brief review of the physical basis of inheritance as we understand it today will indicate more clearly the possibilities of selective breeding and hybridization.

A living organism resulting from sexual reproduction develops from a single cell which multiplies by division. Each cell contains a smaller body, the nucleus, in which are located the chromosomes, the carriers of the determiners of heredity. Genetical investigations indicate that the factors responsible for contrasting characters such as tall or short, white or colored, are located on separate so-called homologous chromosomes which are usually similar in appearance and are closely associated during the process of cell division.

The figures in Diagram No. 1 outline the behavior of the chromosomes during cell division. The circles do not represent the whole cell but merely the nucleus which may be considered as the region of directional force within the cell.

For the sake of simplicity, a nucleus with only three homologous pairs of chromosomes is illustrated. The homologous pairs in the body cell of the individual are indicated as A, a, B, b, and C, c. One chromosome of each of these pairs was derived from each parent of the individual.

Figures 1 and 2 indicate the process by which each cell of a living organism receives exactly the same quantitative and qualitative chromosome complement. Figure 1 illustrates what is known as equational division. Each chromosome divides longitudinally, and as the cell divides to form two daughter cells the nucleus likewise divides as indicated by the indented margin, each daughter nucleus receiving a duplicate set of the original chromosome complement as shown in Figure 2. The body cells continue to divide in this manner during the entire life of the individual.

The divisions which lead to the formation of the germ cells are somewhat different and are illustrated in Figures 3 to 6. The reduction division (Figure 3) is very different from the equational division just described. The homologous chromosomes do not split longitudinally; they come together as whole chromosomes and are then distributed at random but in equal numbers to each of the daughter nuclei. These daughter nuclei (Figure 54), therefore, each receive one chromosome of each homologous set (in upper Figure 4 the chromosomes a, B, and c and in lower Figure 4, A, b, and C). The reduction division is followed by an equational division of the chromosomes (Figure 5) which is similar to that in Figure 1, but in this case involves only three chromosomes. This equational division results in four germ cells whose nuclei (Figures 6) contain half the chromosome number of the body cells of the individual.

The chromosome complements of all of these germ cells are not identical. It was previously noted that there is a random distribution of the entire chromosomes in reduction division. In this case, with three homologous pairs of chromosomes, eight combinations of three chromosomes each are possible and therefore eight types of germ cells, each with with a different chromosome complement, can be produced. Since male and female germ cells are produced in the same manner, it is obvious that if two germ cells of the type shown in upper Figures 6 unite, the resulting individual will not receive the same inheritance as in the case of a union between two germ cells with the complement shown in lower Figures 6. Reduction division not only permits random distribution of the hereditary determiners but also maintains the chromosome number of the body cells constant from generation to generation.

Diagram No. 2 outlines the behavior of the chromosomes

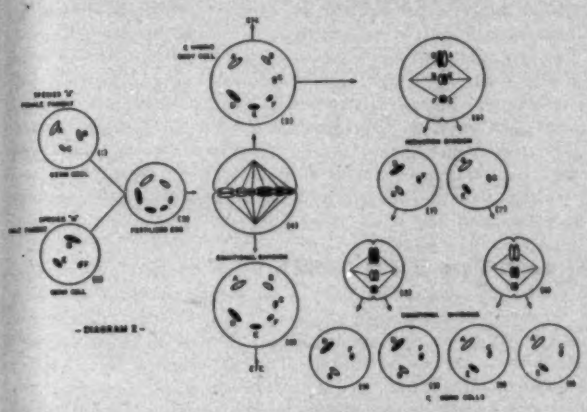
Table 2—(From Bamford and Van Rest, 1936)

Tree No.	1		2		3		4			5			6	
Zones	A*	D	A	D	A	D	A	D_1	D_2	A	D_1	D_2	A	D
Cold water-soluble	6.13	4.30	6.41	5.24	6.29	2.38	5.27	2.31	2.11	6.24	3.66	2.27	5.40	2.73
Hot water-soluble	7.00	5.44	7.91	5.97	9.33	6.48	6.71	4.80	4.52	8.16	6.39	4.77	6.60	4.72
1% NaOH-soluble	23.32	21.27	25.43	20.51	27.71	25.19	22.77	21.39	21.53	22.93	22.19	20.54	22.21	19.11
Alcohol-benzene (1:2)-soluble	5.24	3.97	5.57	4.52	7.38	4.58	4.84	1.94	1.82	6.67	3.09	1.56	5.23	1.64
**Lignin content	22.53	20.39	24.80	21.34	24.19	23.01	22.48	22.40	22.27	21.49	21.53	20.86	21.33	21.49
Cellulose content	51.39	54.19	48.03	52.50	49.40	52.40	52.09	55.63	55.37	51.52	55.70	57.91	54.02	55.13
Methoxyl content	6.84	6.90	6.89	6.73	6.88	5.99	6.73	6.37	6.39	6.51	6.24	6.25	6.43	6.49
Methoxyl in lignin (i)	4.98	4.67	4.99	4.83	4.64	4.62	4.60	4.67	4.51	4.66	4.44	4.25	4.32	4.51
(i) as % of lignin	22.10	22.91	20.12	22.63	19.19	20.07	20.46	20.84	20.25	21.69	20.63	20.37	20.25	20.99
Total pentosans	22.27	23.08	25.17	23.00	25.25	24.79	23.75	23.74	23.10	23.08	23.65	23.67	22.72	22.64
Pentosans in cellulose	10.90	11.20	11.81	10.91	13.81	13.41	12.06	12.77	11.99	11.58	12.54	12.17	12.00	10.69
Pentosans not in cellulose	11.37	11.88	13.36	12.09	11.44	11.38	11.69	10.97	11.11	11.50	10.11	11.50	10.72	11.95
Specific gravity (oven-dry)	0.565	0.628	0.542	0.614	0.539	0.607	0.521	0.587		0.543	0.645		0.522	0.535

All results expressed as percentages by weight of oven-dry 80-100 mesh wood.
*A=Sapwood; D=Heartwood.
**Digestion of wood sample with 72% sulphuric acid carried out at 10°.

following hybridization. The body cells of the parent species "A" and "B" have six chromosomes; thus after reduction division the germ cells (Figures 1 and 2) each contain three chromosomes, lettered A, B, C, and D, E, F respectively. Following fertilization, these chromosomes are combined in one nucleus (Figure 3) and by equational division (Figure 4) the full complement of six chromosomes—three from species A and three from species B—is passed on to each body cell of the first generation (F_1) hybrid (Figures 5).

When the F_1 hybrid reaches maturity reduction division again initiates germ cell formation. Instead of equational division of the chromatin material the individual chromosomes pair, as illustrated in Figure 6. Many species hybrids are not fertile, and their sterility may often be due to a lack of affinity between corresponding parental chromosomes and their failure to pair and function together at this stage of the reproductive process. Figure 6 illustrates a fertile hybrid—chromosomes A, E, and C will move to the right; chromosomes D, B, and F to the left, to the daughter nuclei indicated at Figures 7. The reduction division is followed by equational division (Figures 8) in which each of the chromosomes divides longitudinally, resulting in two daughter cells with identical chromosome complements. These are the germ cells of the F_1 hybrid (Figure 9).



The developmental picture outlined in Diagram No. 2 may be used to explain the rather frequent uniformity of individuals in first generation (F_1) hybrid progenies and the diversity of the second generation (F_2) individuals. If the parent species A and B are quite homozygous, true breeding, then each species will produce germ cells that are much alike in their chromosomal constitution. Consequently, all of the F_1 hybrids wil be the products of the union between male and female germ cells that are very similar in their respective chromosome complements. This combination of parental chromosomes will be maintained in all the body cells of the F_1 hybrids by equational division (Figures 3 to 5) and the individual hybrids since they have the same hereditary potentialities, will react in much the same manner to their environment.

The individuals of the second generation, however, will differ in their chromosomal constitution because random distribution of the parental chromosomes (Figure 6) will result in germ cells with different chromosome combinations (Figures 9). In the case illustrated eight different classes of germ cells can be produced with eight different chromosome combinations. Random unions between these eight kinds of germ cells will give a wide diversity of chromosome combinations which will account for the inherent variation between individuals of the F_2 generation.

This discussion has involved individuals having only three sets of homologous chromosomes, that is, six chromosomes in the body cells. As a matter of fact, forest trees have much higher numbers; for example it has been reported that maple species have from 26 to 90, birch species from 28 to 84, walnut species 34, poplar species from 8 to 76, oaks from 22 to 24, willows from 38 to over 100.

It is apparent, therefore, that merely on the basis of the number of chromosomes the chances for new combinations between two species which do not cross naturally are considerable. But since the chromosomes themselves carry an unknown and possibly large number of genes, each of which is considered to be responsible, alone or in conjunction with other genes, for the development of specific characteristics in the individual, it is obvious that the possibilities for new combinations and new characteristics are practically unlimited.

The Time Required for Improvement of Forest Trees

The development of improved forest trees will not necessarily require several generations of human effort. It is true that selective breeding for improved types that will come "true from seed" will require controlled breeding and selection over a number of tree generations, but the blooming of many forest trees can undoubtedly be hastened by topworking on mature individuals. Thus, scions of a 2-year-old seedling topworked on a mature tree may be brought into bloom within one to three years. This would greatly reduce the time between successive generations, but selection would then necessitate criteria for the recognition of probable mature characteristics in the young tree. Such characteristics as vigor, rate of growth, and resistance to disease can be determined early in the life of the seedling. It seems that adequate correlations between juvenile characteristics and other mature qualities will be found.

Several other short cuts are also possible; for example, any new individual can immediately be multiplied and its hereditary characteristics can usually be maintained if vegetative propagation by cuttings or by grafting is possible. The best of new hybrid poplars developed by the Oxford Paper Company were multiplied in this way. The members of such a vegetative progeny, which is called a clone, are genetically indentical except for occasional mutations which usually occur so infrequently that they are hardly of practical importance. By means of cuttings hundreds of thousands of plants can be produced from one individual within a few years. The preliminary results of experimental work now in progress at the Northeastern Forest Experiment Station indicate that it may be possible to root cuttings of such forest species as birch and maple. Vegetative propagation by grafting or budding is at present considered too expensive for forest planting stock, but the propagation of improved trees by such methods may become economically practicable.

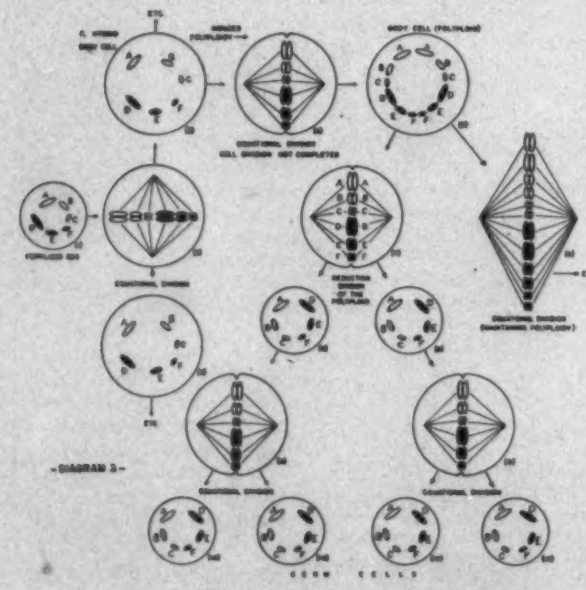
A new avenue of approach to early results in plant improvement has been opened in recent years. Although this approach has hardly been explored and will undoubtedly lead to many disappointments, the possibilities appear very promising. It has long been known that many related plant species have different chromosome numbers which in many cases are multiples of a basic number, a condition referred to as polyploidy. It has also been known from cytological investigations that plants grown in culture occasionally exhibit such multiplication of the basic chromosome number. More recently, it has been discovered that polyploidy can be artificially induced by proper heat or chemical treatment. It has been reported within the past few months that plants with double the original chromosome number can be obtained by treatment of the seed with the alkaloid colchicine. Cytological studies indicate that this doubling is due to a retarding effect of the chemical on cell division; chromosome division takes place, but the nucleus does not divide and the cell wall dividing the original cell is not formed. Con-

sequently, the cell is left with two complete sets of chromosomes and then continues to form new cells with this double number. This method may be used to produce, in practically one step, true breeding polyploid types which may be considered as new races or new species.

The mechanics of induced polyploidy as visualized for a hybrid individual are indicated in Diagram 3. As in Diagrams 1 and 2, the circles represent the nucleus. Figure 1 represents the fertilized egg resulting from the union of two germ cells of two distinct parents, one parent supplying the chromosomes A, B, and C indicated in solid black, the other supplying chromosomes D, E, and F indicated in outline. The fertilized egg in the course of its normal development will, by equational division, continue to produce cells with six chromosomes—three from one parent and three from the other (Figures 2 and 3). However, if the seed is treated with colchicine, the normal equational division is interrupted as indicated in Figures 4 and 5. The chromosomes divide longitudinally and the halves separate, but the cell and nucleus do not divide. The result is a nucleus with two complete sets of chromosomes (Figure 5). During the development of the individual these twelve chromosomes continue to divide equationally as indicated in Figure 6.

Seed treatment may induce doubling of the chromosome number in only a part of the embryonic tissue in which case only parts of the new plant are polyploid. When a polyploid branch reaches the fruiting stage, the germ cells are derived by the usual reduction division as indicated in Figure 7. The daughter nuclei (Figures 8) resulting from the reduction division each have six chromosomes. By equational division (Figures 9) germ cells (Figures 10) are produced each with six chromosomes, three from the original female parent and three from the original male parent. Thus the germ cells of the polyploid have a double number of chromosomes, and the union of such germ cells maintains the polyploid condition in the progeny.

Although the artificial compounding of polyploids appears to offer almost unlimited possibilities, a note of caution is necessary. In the first place, the field has just been opened, and much more experimental work is necessary before we can know the limitations of this new tool. The polyploids which have been produced are purely of academic interest; practical improvement has hardly been demonstrated. Furthermore, artificial polyploids may prove to be of more value to agriculture and horticulture than to foresty.



From the standpoint of forest tree improvement the creation of polyploids offers the following advantages:

1) Polyploidy may increase variation and produce new types more vigorous than the forms from which they are derived.

2) Balanced polyploids will breed true and can immediately be propagated from seed.

3) They would not cross with the native species and would therefore maintain their characteristics from generation to generation under forest conditions.

The disadvantages can be briefly summarized as follows:

1) New types can be expected, but there is no assurance that the new trees will be better for practical purposes than existing species.

2) Polyploidy is often associated with increased cell size. Larger wood cells would lower the quality and value of many forest trees. Larger cell size in wood is often directly correlated with lower strength values and lower density, thus lower chemical yield. Increased fiber size in some pulp species would probably make them less useful for the manufacture of paper.

Selection

The production of new individuals by breeding and hybridization must be followed by selection of the best individuals for immediate use or for continued breeding. Selection should be on the basis of forest requirements and use requirements. The forest requirements, including such characteristics as rate of growth, ease of propagation, resistance to climatic conditions, resistance to disease and insects, and good growth form, must be set up by the forester. The use requirements, such characteristics as yield of gum in southern pines (which appears to be inherent), lumber quality, workability, strength, and chemical and physical properties of the wood, should be delineated by the industries using the wood.

Relatively simple and rapid tests are needed for selection of the best trees on the basis of their use requirements. With hundreds or thousands of trees to be tested, selection on the basis of wood quality requires either a large technical staff or rapid testing methods. For example, the Northeastern Station is now working with several thousand poplar hybrids produced by the breeding project of the Oxford Paper Company. Up to the present time, selection has been from the standpoint of forest requirements. Since it is known that the parents of these hybrids vary in fiber length, it is reasonable to assume that the hybrids will also vary in this characteristic. It is also suspected that these hybrids may vary in other physical characters and in the chemical properties of their wood, such as the percentage and nature of extractives, of lignin and of cellulose. Present methods for the detection of such differences would require far more technical help than can be mustered.

Inheritance of Wood Characteristics

There is evidence that many characteristics of the wood of forest trees, such as twisted fiber, color, and figured grain, are heritable and therefore subject to improvement by breeding. The cricket bat willow is an example of improvement of wood quality resulting from hybridization. The wood of this willow, which is claimed to be a hybrid, is considered to be far superior to the wood of either parent for the manufacturer of cricket bats.

Very little specific information is available on the inheritance of the physical and chemical properties of the wood of forest trees. Chowdhury (*1*) studied the anatomical structure of the wood of the Dunkeld larch, a natural hybrid between the Japanese larch and the European larch. The information in Table 1 is taken from Chowdhury's paper. It will be seen that the longitudinal resin canals

resemble those of the male parent; the horizontal resin canals, on the other hand, resemble those of the female parent. The fusiform and the linear rays, as well as the length of the tracheids in the springwood, also resemble those of the female parent, but the tracheid length in the summerwood is intermediate between that of the two parents as is also the tangential diameter of the tracheids and the thickness of the tracheid walls. The striations on the tracheid walls, however, resemble those of the female parent. This study of the Dunkeld hybrid larch indicates that the anatomical characteristics of the wood and the physical characteristics of its fibers are heritable.

In formation on inherent variation of the chemical characteristics of the wood appears to be almost entirely lacking. The variation in the chemical composition of the wood from different parts of the same tree and the difficulties involved in complete chemical analysis are apparently responsible for the dearth of information on this subject. In a paper by Bamford and Van Rest (*2*) the authors state that the objective of the study was ". . . in the first instance to determine whether the chemical composition of ash wood varies within a single tree as well as from tree to tree in a single locality . . ." Wood of the English ash was cut from six representative trees growing in the same locality. Information on age, rate of growth, or environmental conditions under which these trees were growing is not given. On the basis of the data obtained the authors conclude that "Because of the variations in composition within individual trees it would be difficult or impossible by means of a limited number of anlyses carried out by current methods to differentiate chemically between trees of the same species."

Table 2 lists a portion of the data reported by these workers. Analyses were based on samples taken from sapwood, intermediate wood, and heartwood, but only the figures for sapwood and heartwood are included here. Trees Nos. 4, 5, and 6 contained the heartwood discoloration known as "black heart," but the authors state that " 'black heart' does not appear to be associated with any irregularities in the relative proportions of the major components present in the trees" . . . It will be noted from Table 2 that the chemical composition of the sapwood differs quantitatively from that of the heart wood. The intermediate wood, for which data are not included in Table 2, was in most cases intermediate between the sapwood and the heartwood.

The per cent cellulose varied in the sapwood and heartwood of the same tree, but the variation was always in the same direction, higher in the heartwood. The per cent cellulose in the sapwood of the individual trees varied from 48.03 in tree No. 2 to 54.02 in tree No. 6. The per cent cellulose in the heartwood of these same trees varied from 52.50 (tree No. 2) to 55.13 (tree No. 6); the total variation for all trees was from 52.4 in tree No. 3 to 57.91 in tree No. 5.

The per cent lignin was in all but one case higher in the sapwood than in the heartwood and varied from 21.49 in the sapwood of tree No. 5 to 24.80 in the sapwood of tree No. 2. In the heartwood the variation was from 20.39 per cent (tree No. 1) to 23.01 per cent (tree No. 3).

Since there is no information on the environmental conditions under which these trees were grown, it is impossible to judge to what extent these variations indicate heritable characteristics; the figures for precent cellulose might indicate inherent differences if the trees were th same age and had ben grown under practically identical conditions.

Many characteristics of the wood of forest trees are probably inherent in the individual or in the race. As use requirements are more definitely correlated with individual characteristics or qualities of the wood, we will undoubtedly find that many of these characteristics are inherent and therefore susceptible to improvement.

In conclusion, it may be said that forest tree improvement has only just been started. The search for superior germ plasm should uncover new, and as yet unknown, potentialities. Superior trees or strains, as they are discovered, may be utilized directly for forest planting, and their germ plasm will be the raw material of the tree breeder. Each generation of forest geneticists will discover or create trees that are a little better, and each succeeding generation will receive a heritage of constantly improved germ plasm as a starting point for the further improvement of forest trees. And so the unending process of improvement will continue. The possibilities appear almost unlimited because the creative method of the scientific plant breeder is somewhat analogous to the synthesis of the chemist. The chemist works with molecules and atoms; the breeder, with chromosomes and genes. Both create the new out of almost endless rearrangements of existing units.

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SEPARATORS NECESSARY IN STEAM PLANTS

IN handling steam in any plant, it is essential to deliver it at its point of usage as free of moisture and other liquids as it is possible to obtain it.

In live steam lines, condensation is always a source of loss, whether the steam is to be used to drive an engine, turbine, or pump, or whether the steam is to be used as a heating medium.

In exhaust steam lines, oil from the engines or pumps renders the steam unfit for further use as a heating medium or for direct return to the boilers. Oil in pipes, radiators, or on other heating surfaces checks free radiation of heat; oil in boilers combines with impurities in the water, and if present in any appreciable quantity forms a thick insulating coating over all the heating surface. Steam and oil separators afford an efficient, economical means of removing such condensation and oil.

In order to secure maximum efficiency from separators they should be selected on the basis of the amount of steam to be handled and not on existing pipe sizes. Too small a separator means too high a velocity with a resultant poor separation. Knowing the amount of steam to be handled, the size of separator can be figured from the following formula:

$$C = \frac{A \times B \times 2.4}{V}$$ in which

C — Area of inlet in square inches
A — Pounds of steam per hour
B — Volume in cubic feet of one pound of steam at the given pressure
V — Velocity in feet per minute
(Velocity should be figured as being 7,000 feet per minute, maximum.)

(From *Valve World*)

▶▶▶ ALL THAT IS HARMONY for thee, O Universe, is in harmony with me as well. Nothing that comes at the right time for thee is too early or too late for me. Everything is fruit to me that thy seasons bring, O Nature. All things come of thee, have their being in thee, and return to thee.—*Marcus Aurelius.*

Factory St Harrison NJ

After four years of intensive research, the Woburn Degreasing Company, of Kearny, New Jersey, has discovered many new industrial uses for castor oil and its by-products. This company has become convinced the way is open for profitable domestic cultivation of the castor oil plant, and in this article, its president, A. G. H. Reimold, predicts the use of cellulose from the castor oil plant by the American paper industry as a means of solving the problem of higher and increasing costs of other raw materials.

Castor Oil Plant

May provide cheap cellulose

A. G. H. REIMOLD, President
Woburn Degreasing Company

ALTHOUGH thus far unused by the paper industry, America now imports approximately 164,000 pounds of castor beans, principally for use by the drug, paint, leather, textile and fertilizer industries. About 500,000 acres of foreign land produce this supply which, if replaced by domestic growing, would return a minimum of $20,000,000 annually to American farmers. While it long has been known the plant can be grown in this country, it has not been cultivated to supply this existing market because past industrial uses have been so limited that American farmers could not compete profitably with the crop imported from countries with cheaper labor and lower living conditions.

Recognizing the crop could be grown profitably in this country to the benefit of both American industry and agriculture, if the market was broadened, the research program carried on by the Woburn firm sought every possible new use not only for the oil, but the bean, stalk fibers and even the roots. So successful was the research, that the author is convinced a profitable crop now is assured farmers and that industry will be able to obtain oil and by-products of better quality at less cost. The existing market using a 500,000-acre crop, with a twenty-million-dollar annual return, will be so broadened that it eventually will lead to cultivation of 35,000,000 acres with proportionate national income increases.

The Woburn experiments revealed that a high grade cellulose can be produced from the stalk of the castor oil plant: (1) the outside sheath of the stalk (about .025 of an inch thick) which completely surrounds the stalk and the limbs of the plant from the ground to the top and to the tip of the branches; and (2) the woody or tough part of the stalk. Although the cellulose produced from these two parts of the plant showed slightly varied characteristics, it proved to be of high quality and to have good tensile

strength. An outstanding advantage of the production of cellulose from the castor oil plant is the low price at which it can be had in comparison with other sources.

While there are many other vast new industrial uses for the derivatives of the castor oil plant fibers, the paper mills alone could use all of this material that American farmers can raise. It is further significant that agricultural experiments show sufficient castor oil plant fibers could be cultivated domestically to supply the paper needs of the entire country, thus relieving economic dependence of this industry on importation of raw materials.

Chinawood Oil Substitute

Other new industrial uses for this plant have been discovered through research. For instance, a thorough survey of the use of castor oil derivatives as a replacement for chinawood oil has resulted in the development and marketing of a drying oil for insulating varnishes and other products. This castor oil by-product replacement of chinawood oil is of great industrial significance due to the instability of chinawood oil imports. Other similar castor oil derivatives are being developed and, with the assurance of heavy volume supply from domestic growing, will meet an expanded market in many industries.

Plastics

Successful development of plastics from the castor oil plant also resulted from experiments and plastic materials were produced which have a ready market in industries manufacturing a wide variety of molded plastic containers.

Insecticide

From the plant leaves were derived a powerful insecticide, which is suitable for production commercially both for household pest extermination and agricultural uses. The press cake, or the residue after the oil has been extracted, is now being used for commercial fertilizer, but expanded and more effective uses are being developed.

Soil Regeneration and Pest Control

Regarding the benefits of the castor oil plant as a means of solving the problems of soil regeneration, wind erosion, dust storms, drought, and pest control, it has been proved that every farmer could afford to use the plant in rotation with other crops, regardless of its return from commercial uses. This highly nitrogenous plant has many soil regeneration features and could appreciably reduce the vast areas of sterile land now so costly to individual farmers and the Nation as a whole. Pest control might be considered one of its most important aspects, it having been proved the plant is deadly to many forms of insect life. Grasshoppers and locusts cannot live to pass through or immediately over a field of castor bean plants because of the poison "Ricin," which is released. Although this does not affect man, it is deadly to any insect. The roots of the plant will kill insect larvae.

The Woburn Industries invite the co-operation of all scientific organizations and manufacturing interests to join them in an effort to render a practical service to this country by making use of facilities they may possess to shorten the time lag between techincal advances and their commercial use in the form of new products. To the agricultural interests of America, Woburn Industries acknowledge a duty and suggest mutual support in the development of the country's natural resources.

Introduction of the new crop to America has passed the experimental stage. From more than three thousand known varieties of seeds, the Woburn Farm Bureau has advanced the culture of the plant most suited to the domestic planting and new industrial uses. Seeds have been made available to accredited individuals and groups for the pilot crop planting. About 200,000 acres already have been planted in various sections of the country. The National Grange, Farmers Union, and other organizations are co-operating. The Agricultural Chemical Association, a new group headed by former U. S. Senator Smith W. Brookhart of Iowa, has been formed to promote co-operation between industry and agriculture in the new movement.

Acknowledgment

The author acknowledges the efforts of the following Woburn officials who have contributed to research work on the castor oil plant: Dr. K. A. Pelikan, chief chemist; Dr. H. P. Straus, manager, Woburn Industries, and M. D. L. Van Over, director, Woburn Farm Bureau.

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PREPARING THE SURFACE FOR RE-PAINTING

THE importance of periodic painting for protecting surfaces against deterioration as well as for the sake of appearance is well recognized. Frequently overlooked, however, is the fact that in many cases the proper preparation of the surface to be repainted has as much or more to do with the appearance and quality of the finished job as the technique of application and the quality of the new paint.

Although some painted surfaces are simply sanded or brushed down in preparation for the new coat, it is often desirable, because of cracks, chips or air holes in the original coat or the number of previous coats, to remove the old paint entirely so as to leave the surface of the base material clean and smooth for repainting. One of the best methods is to soften the old paint with a special air-acetylene paint burner and it can then easily be removed with a putty knife or scraper. The greater the number of coats of old paint, the better the air-acetylene paint burner works.

The paint burner consists of an air-acetylene torch equipped with a flat head which spreads the flame out to a width of 3 in. By simply changing the direction in which the torch handle is held, the width of the path of application of the flame on the work surface can be varied from ½ in. to 3 in.

The needle valve on the handle makes possible a quick adjustment of the flame length from 1/16 to ¼ in., according to the volume of heat required. Thus the flame is steady and under direct control of the operator at all times regardless of the position in which it is held.

The flame of an air-acetylene burner is free from soot and smoke, and is not easily blown out by the wind. It is of even, high temperature throughout. There is practically no low-temperature flame surrounding a high-temperature center, hence the heat is applied evenly over the entire flame area. The flame is compact and of definite dimension and therefore can be accurately applied to the work surface in contrast with the diffuse, bushy flame of the blowtorch.

By heating the paint to the plastic condition with the air-acetylene flame, it is a relatively simple matter to take off many coats of paint leaving the base material fresh and clean. The laborious task of applying chemical removers is avoided and there is no acid to injure the new paint.

(Oxy-Acetylene Tips)

PAPER SKETCHES

RACING SHELLS
CANOES, PLEASURE BARGES—AND EVEN STEAM LAUNCHES—WERE BEING CONSTRUCTED OUT OF PAPER IN TROY, N.Y., IN THE 1880'S

PAPER BAGS WERE FIRST MADE IN AMERICA DURING THE 1830'S BY THE MORAVIANS OF PENNSYLVANIA WHO PASTED SHEET EDGES TOGETHER TO AVOID WASTING PAPER IN THE WRAPPING OF BUNDLES.

GOVERNMENT OWNED RETAIL STATIONERY STORES WERE SET UP IN ENGLAND DURING THE 1690'S TO ASSURE COLLECTION OF A PAPER SALES TAX. UNDERSELLING THE REGULAR RETAILER WAS GIVEN AS THE PRETEXT FOR THEIR EXISTENCE

ABOUT 10% OF THE PAPER PRODUCTION CAPACITY OF THE U.S. IN 1935 WAS LOCATED IN FOUR COUNTIES—PENOBSCOT IN MAINE, KALAMAZOO AND MONROE IN MICHIGAN, AND BUTLER IN OHIO.

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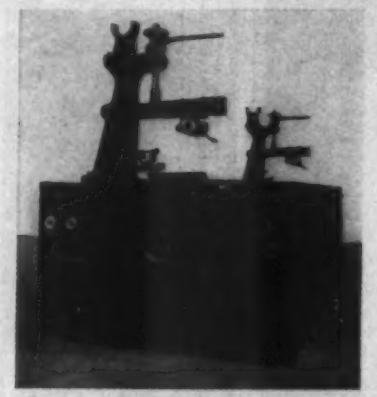
NEW EQUIPMENT AND SUPPLIES

Cylinder Machine Vat

A cylinder machine vat, designated as the Control-Flow vat, has been announced by the Bagley and Sewall Company, Watertown, N. Y. This vat is provided with adjustable controls which are equipped with graduated dial indicators. It is designed to operate with the cylinder mold rotating in a counter direction to that of



the in-flowing stock. Provision also is made for maintaining a constant level not only within the mold, but within the vat on each side of the mold. These levels are held automatically within the limits of normal variations. Corrections at other times may be made through the adjustment of controls on the front end of vat. Among the advantages cited for the vat by the manufacturer are: reduces tendency of stock to foam; decreases power requirements for pumping; and permits sheet formation over wide range of weights.

Stiffness Gauge and Shear

Taber Instrument Company, North Tonawanda, N. Y., has announced the Taber V-5 stiffness gauge for the measurement of the stiffness and resilient qualities of paper.

It also has announced a triple-cut shear for blanking out accurate test specimens. The stiffness gauge features metric calibration with a continuous scale from 0-2000 gram centimeters, rugged construction, and sensitive bearings sealed in lubricant for years of service without further attention. Test specimens, 1¼ in. x 4¼ in. x .030 in. maximum thickness, are blanked out by the triple-cut shear.

Flow Gage

A new design of rotameter has been placed on the market by Fischer & Porter Company, 110 West Penn St., Germantown, Philadelphia, Pa. This rotameter, known as the Rotameter with Rotatable End Fittings, is compact, neat, and simple. Its tapered Pyrex tube is mounted in a polished brass case, an ample slot in which permits the bright red flow graduations to be viewed.

Knurled nuts at each end of the case hold the end pieces in position. These pieces have both vertical and horizontal connections. The ball indicator float drops out when one of the knurled nuts is unscrewed.

This rotameter is made in any capacity from a pint a day to 50 gallons per minute. It also handles gases. All sizes are equipped with precision bore interchangeable tubes.

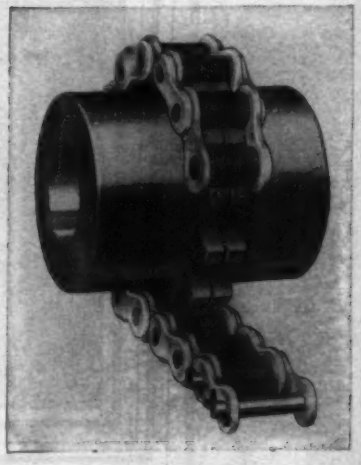
Oil Seal for Bearings

A new patented oil seal, designated as the Garlock SPLIT-KLOZURE, has been announced by The Garlock Packing Company, Palmyra, N. Y. It consists of a cut-open, composition sealing element or packing ring, molded into a shape which, in cross section, resembles a modified V, and a finger-type spring to which the sealing element is bonded under pressure. The composition material of the sealing element is dense, grainless, oil and heat resistant,

and has a low coefficient of friction. The seal can be used equally well on shafts mounted either on plain, sleeve-type bearings or on anti-friction ball or roller bearings. Dryers, press rolls, and jordans are representative items of paper mill process equipment, suggested by the manufacturer, for which the seal is applicable.

New Flexible Coupling

A new flexible coupling, designated as Type "RCB," has been announced by Link-Belt Company, 307 N. Michigan Ave., Chicago, Ill. This coupling consists of two cut tooth sprocket wheels (or coupling halves) and a piece of specially constructed single-width finished steel roller chain to connect them. The chain, using a recently patented divided roller feature, provides independent roller action for each sprocket, and, as the contact between roller and sprocket causes



the roller to revolve on its bushing, any tendency to scuff the roller and sprocket teeth is said to be avoided.

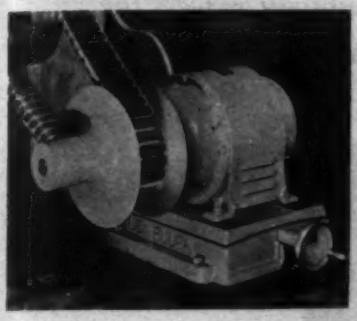
When specified, a grease retaining housing is furnished for enclosure and automatic lubrication of the coupling. Two fittings inside the housing, 180 deg. apart, permit packing the housing with grease without necessity of dismantling. There also is a seal between the two halves to avoid leakage of grease.

Surface Sealer

Glyco Products Co., Inc., 148 Lafayette St., New York, N. Y., has announced the development of ABOPON, a clear, transparent, inorganic, non-inflammable odorless liquid which can be diluted with water and applied to the surface of paper by dipping, brushing or spraying. This application, on drying, leaves a transparent, colorless film on the surface of the paper as an effective seal against the penetration of lacquer or other coatings, or of oils and greases. It is claimed that, with the use of ABOPON, the desired effect, in general, is obtained with one or at the most two coats of lacquer or other coatings.

Variable Speed Motor Pulley

A variable speed pulley which fits the shaft of a standard motor and drives directly to a pulley or sheave on the driven shaft has been announced by Lewellen Manufacturing Company, Columbus, Indiana. The motor and pulley mount upon an adjustable base, which permits wide



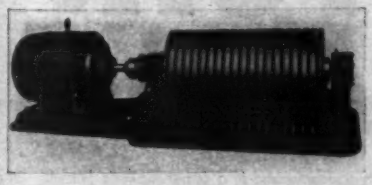
variation of speed of the driven shaft. Several features of the pulley, cited by the manufacturer, include: positive equalized disc travel in both directions, uniform low spring pressure at all pulley diameters without buckling belt, hardened steel driving members with ample bearings areas, and pressure lubrication to all bearing surfaces, with all working parts, including the spring, completely enclosed.

Wide Range Test Paper

R. P. Cargille, 118 Liberty Street, New York, N. Y., has announced a test paper that gives five color changes in a pH range of 2 to 10. The paper, suggested for the rapid determination of approximate pH, can be used, it is claimed, with turbid and highly colored solutions by observing color of outer diffusion zone on spot tests.

Chip Crusher

D. J. Murray Manufacturing Company, Wausau, Wisconsin has developed a hammer-type crusher for the reduction of chip screen rejects. This crusher, designated as the Murray High Speed hammer crusher, is



made in three standard sizes—24 in., 36 in. and 48 in.; and is designed to operate at a speed of from 1,000 to 1,400 r. p. m. Its approximate capacity range is from 75 cords for the 24 in. unit to 150 cords for the 48 in. unit per 10 hours of operation.

Combustible Gas Indicator

A combustible gas indicator, known as the M.S.A. Explosimeter, has been announced by Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa. The instrument weighs less than 3 lb. complete with batteries. Its overall dimensions are 1¾x4¼ inches. Adjustment of a single knob is all that is necessary to prepare it for use and to maintain it in operating condition. This single control is used to turn the instrument on and off, balance the electrical circuit, and indicate the extent to which the battery in the instrument has been consumed.

In operation, a sample of the atmosphere to be tested is drawn through a length of hose into the Explosimeter where it flows over a hot platinum wire. The wire, forming a part of a balanced electrical circuit,

is provided with current by two small dry cell batteries. Combustion of gases on the surface of the filament unbalances the electrical circuit, which, in turn, causes a deflection of the pointer of an electrical meter. The concentration of the gas may be read directly on the meter, which is graduated in percent of the lower explosive limit.

The Explosimeter is supplied in leather case with shoulder carrying strap and includes a pocket for sampling line and spare batteries.

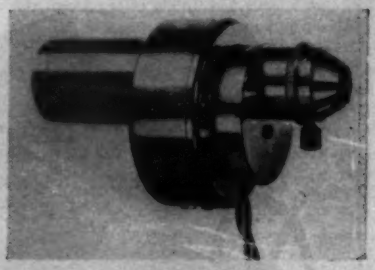
Control for Variable Speed Drive

Reeves Pulley Company, Columbus, Indiana, has announced an automatic and remote control for use with its Vari-Speed Motodrive. The control, known as Fluid Pressure Control, consists of a bellows shifting mechanism mounted on the Moto-

drive, an adjustable pressure reducing valve located where desired, auxiliary valves if needed, and connecting pipes. Fluid pressure is transmitted by means of oil, water, steam, gas or air by a valve through piping to the bellows shifting mechanism which operates to increase or decrase speed on the Motodrive. Pressure gauges may be used to indicate relative speed of the Motodrive.

Radiation Pyrometer

A radiation pyrometer which uses a temperature-sensitive unit known as the Ardometer has been announced by The Bristol Company, Waterbury, Conn. This



instrument measures the surface temperature of hot objects or masses above 1000 deg. Fahr. when the Ardometer unit is sighted so that it picks up the heat rays emitted. The temperature is recorded on a Bristol potentiometer (a round or stripe-chart recorder) or is indicated on a millivoltmeter pyrometer.

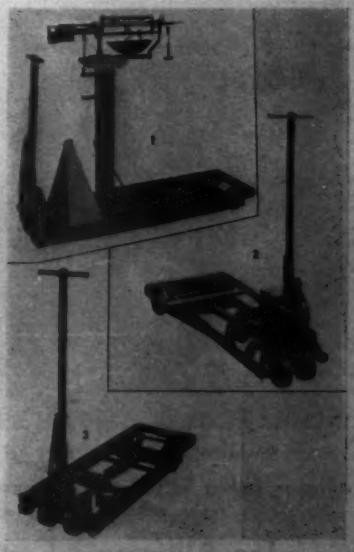
Hand Lift Trucks

Three new designs of hand lift trucks have been announced by The Yale & Towne Manufacturing Company, 4530 Tacony Street, Philadelphia, Pa.

Incorporated in the design of one of these trucks is a beam scale with a capacity of 1000 pounds. This truck, known as the Yale Blue Streak scale truck, has a compounded lift; has ball-bearing equipped, rubber-tired wheels; and is made in frame heights ranging from 7 in. to 12 in.

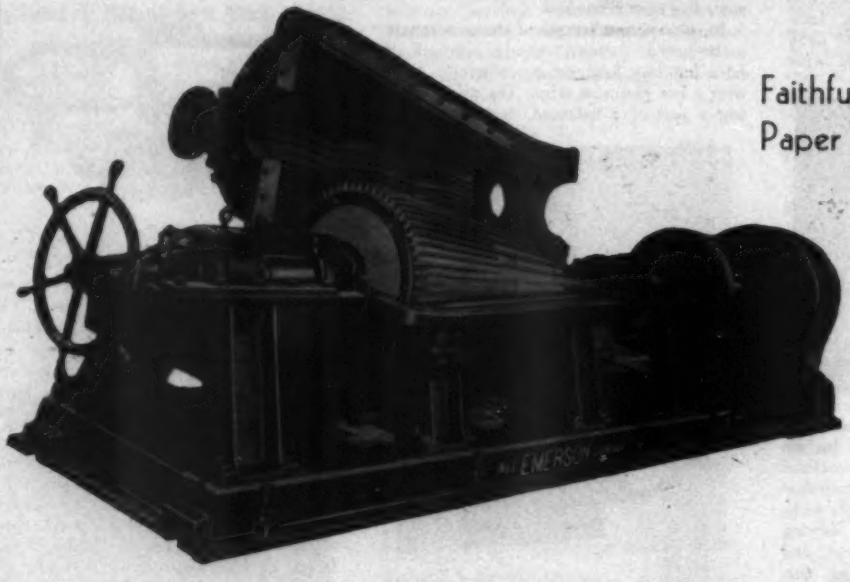
A second truck, a four stroke lift truck designated as Yale Model 2500, is a wide frame model with a capacity of 2500 pounds. It can be furnished with ball or roller bearing equipped, rubber-tired, steel, or semi-steel wheels.

The third truck, Model 2000, is a single



stroke lift truck with a side lift, balanced handle. This truck is equipped with semi-steel wheels and Hyatt bearings, a roller type treadle, and an automotive-type release check. It has a capacity of 2000 pounds.

EMERSON JORDANS



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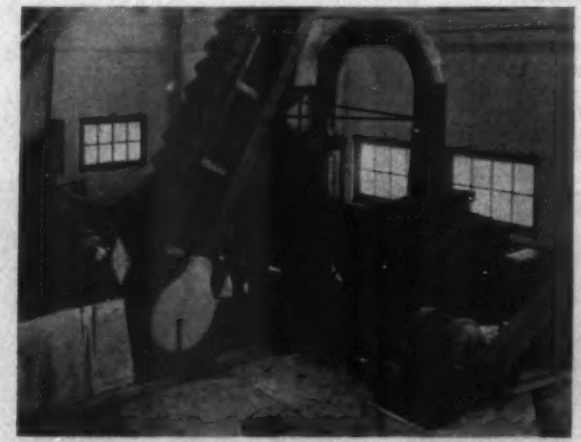

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PAPERMAKING PATENTS

IN THE UNITED STATES — Compiled by James Atkins, Registered Patent Attorney

Inquiries should be addressed to James Atkins, Munsey Building, Washington, D. C.

Moistureproof Coated Paper and Process of Making the Same

Patent No. 2,117,199. Bert C. Miller, Montclair, N. J., assignor to Bert C. Miller, Inc., New York, N. Y., a corporation of New York. Application March 21, 1934, Serial No. 716,643. 8 Claims. (Cl. 91—70). A fibrous foundation having a coating comprising a metallic soap to enhance the moistureproof character of the coating, an ester-gum adapted to make the coating glossy and hard to the touch, a plasticizer and a stearic acid wax adapted to increase the moistureproof character of the coating without the use of as much metallic soap as might otherwise be necessary to attain the same moistureproof character without the stearic acid wax, the proportions of materials in the coating being such that the foundation appears substantially transparent and possesses sufficient moistureproofness to allow not more than about one-half of a gram of water per one hundred square inches of surface at 70 deg. Fahr., with 50 deg. relative humidity to penetrate the foundation and coating in twenty-four hours.

Doctor Mechanism for Rolls and Cylinders

Patent No. 2,117,032. Frederick W. Lodding, Worcester, Mass. Application July 17, 1935, Serial No. 31,872. 4 Claims. (Cl. 92—74). In a device of the class described, a thin flexible blade providing a straight scraping edge, a holder for pivotally supporting said blade with said edge parallel to the axis of a rotating surface with which the edge engages, a member of greater stiffness than said blade carried by said holder for engaging the surface of said blade intermediate its edges, and means for shifting said blade engaging member within the holder at right angles to the edges of said blade to vary its zone of engagement with said blade.

Process and Apparatus for the Manufacture of Paper Products

Patent No. 2,113,297. Henry A. Ellis, Sharonville, and William A. Slattery, Hamilton, Ohio, assignors to The Philip Carey Manufacturing Company, a corporation of Ohio. Application April 3, 1933, Serial No. 664,148. 19 Claims. (Cl. 92—20). The method of preparing pulp to be used in forming felted sheets comprising separating the fibers of textile material by beating and subjecting same to the action of a plurality of cylindrical rods assembled so as to readily roll over each other under their own weight, whereby the fibrous material is separated into individual fibers without materially reducing the length of same. An apparatus for making a felted sheet comprising a beater adapted to receive the stock and beat same in the presence of water, means for removing the water to leave the stock in a moistened condition, means for treating the said beaten stock of water and fibrous containing material to separate the fibers without materially reducing their length, and means for forming the stock into a sheet, said means for treating the moistened stock comprising a rotating container having disposed therein a plurality of loose rods adapted to roll over each other when the container is rotated.

Paper Stock Deinking Method

Patent No. 2,116,511. Theodore Earle, Denver, Colo. Application December 22, 1934, Serial No. 758,829. 11 Claims. (Cl. 92—13). That method of salvaging used paper fiber for reuse in paper manufacture which comprises subjecting used paper stock to maceration, alkali treatment and agitation, partial dewatering of the macerated, subsequent mechanical rubbing of the resultant pulp between yieldable surfaces and froth flotative separation of impurities from the product of said mechanical rubbing. The method of salvaging used paper stock for reuse in paper manufacture which comprises subjecting of the stock to an alkaline treatment, washing of the alkali treated stock, and subsequent agitation of the resultant pulp in a froth flotation cell with a fatty acid for froth flotative separation of the ink particles and stock fibers.

Stuff Treatment Apparatus

Patent No. 2,114,101. James T. Coghill, Hoosick Falls, N. Y., assignor, by mesne assignments, to The Noble & Wood Machine Co., Hoosick Falls, N. Y., a corporation of New York. Application March 28, 1934, Serial No. 717,719. 2 Claims. (Cl. 137—153). Feed pressure control apparatus for a conduit adapted to feed paper pulp or the like which includes in combination a diaphragm, a feeder pipe having one end opening at one side of said diaphragm and the other end opening into said conduit for transmitting static pressure in the conduit to said diaphragm, a source of water pressure independent of pressure in the conduit and a water supply pipe connected to admit a controlled volume of water from said independent source to said feeder pipe between said end openings.

Coated Paper

Patent No. 2,117,200. Bert C. Miller, Montclair, N. J., assignor to Bert C. Miller, Inc., New York, N. Y., a corporation of New York. Application December 17, 1936, Serial No. 116,248. 7 Claims. (Cl. 91—70). The process of providing a high gloss thin surface film firmly adhering to a porous flexible base free from impregnation by the material composing the film which includes melting a synthetic resinous composition comprising the plasticized reaction products formed by the esterification of a polybasic acid by a polyhydric alcohol which is flexible, hard up to about 120 deg. Fahr. and non-blocking at normal temperatures, applying the molten resin to a heated element to form a film thereon, transferring the said film to a surface of the flexible base at a temperature below that at which the fluidity of the resin is high enough to cause substantial impregnation of said base, and quickly solidifying the resinous film substantially entirely by cooling before the film has substantially impregnated said foundation and heating the exposed surface of the film to smooth it.

Tissue Face Towel

Patent No. 2,113,431. Alma D. Milliken, Rye, N. Y. Application January 13, 1937, Serial No. 120,411. 3 Claims. (Cl. 92—68). A device for removing cosmetic cream from the skin comprising a tissue paper towel having a multiplicity of apertures therein resulting from the removal of portions of said towel, said apertures being adapted to pass cream from the active to the inactive surface of the towel, and the peripheral edges of said apertures being roughened and raised from the plane of the active surface of said towel to provide a brush-like effect and aid in the removal of the cream through the said apertures.

Press Roll for Paper Making Machines and the Method of Making Same

Patent No. 2,114,072. Ralph E. Cleveland, Waterbury, Conn. Application May 7, 1935, Serial No. 20,211. 3 Claims. (Cl. 92—49). A press roll for paper making machines, comprising a metal cylinder having a sandblasted, chromium-plated and polished surface containing indentions in random distribution therein, said indentions ranging in diameter from about 0.005 to 0.04 inch and in depth from about 0.002 to 0.02 inch, the chromium plating having a thickness ranging from about 0.001 to 0.01 inch.

Fabric, Paper, Leather, Or the Like

Patent No. 2,116,289. Thomas Lewis Shepherd, London, England. Application March 29, 1935, Serial No. 13,736. In Great Britain June 11, 1934. 3 Claims. (Cl. 91—50). In apparatus for use in manufacturing elastic fabric, a reservoir for liquid coagulable material, a feed roll partly immersed therein, a printing roll contacting said feed roll, a pressure roll mounted adjacent said printing roll in such a manner as to permit a fabric sheet to pass therebetween, said printing roll having grooves in the periphery thereof, said grooves being substantially V-shaped and the depth of each being substantially equal to the width thereof at the mouth whereby said grooves hold approximately one-third of the liquid material therein by capillary attraction when the exposed surface of the liquid within the grooves engages the fabric sheet.

ASSOCIATIONS

EMPIRE STATE TAPPI MEETING

The Empire State Section of Tappi held its second spring meeting on June 4 at Watertown, N. Y.

This meeting combined business with pleasure and the committee did a very fine job. A sports program, including golf at the Jefferson County Country Club or trapshooting at the Watertown Country Club, provided entertainment for most of the men during the afternoon, following a delightful buffet luncheon at the Jefferson County Golf Club's headquarters.

The committee provided special entertainment for the women. This included a sight-seeing trip to the new International Bridge across the St. Lawrence, or a contract bridge tournament for those who would rather play cards.

Following a delightful dinner at the Hotel Woodruff, C. F. Richter presented the prizes for the various events. Mrs. F. C. Goodwill and Mrs. H. T. Murphy captured the prizes in the bridge tournament; G. E. Osterheldt and R. Nelson Rose bagged the prizes in the trapshooting tournament; W. E. Bailey had low gross score, F. W. O'Neil had low net, C. E. Libby won the "Blind Bogey," and H. P. Cannon the high gross score in the golf tournament, and were awarded prizes for their ability to direct the golf ball along its improper course.

John Tuttle, director of the Processing Oils Division of the Standard Oil Company of New Jersey, gave an enlightening talk on "Petroleum in the Paper Industry."

The announcement of the election of officers brought about the following selections:

Chairman, J. H. Rich, Newton Falls Paper Company; vice chairman, R. F. Huntley, Oswego Falls Corporation; secretary-treasurer, F. G. Calkin, Solvay Process Company.

Executive committee: C. E. Libby, H. P. Cannon, C. F. Richter and E. G. Ham.

◆

C-Z ASSOCIATIONS MEET IN PORTLAND

The Crown Zellerbach Technical and Superintendents Association met in Portland May 24 to take part in a discussion by Phil Simco, Crown Zellerbach wood technician of Port Townsend, and to honor eleven veterans of the Camas, Wash., mill with service pins. Roy Young, of San Francisco, vice president of the company, presented 20-year pins to George Chinakos, Maurice Godsil, Robert J. Bills, J. A. Beachamp, Ernest Montgomery and Dave Hirschberger; 25-year pins to Benjamin Reed, Otto Pieritz and F. F. Sullivan, and 35-year pins to Claude Smith and Harvey (Tim) Turner.

◆

▶▶▶ *G. H. Gustafson,* until recently forest engineer and assistant woods manager for Donnacona Paper Company, is now assistant forester of the Woodlands Section of the Canadian Pulp and Paper Association, replacing E. E. Grainger who resigned to take a position with the Lake Sulphite Pulp Company.

◆

A. R. JACKSON ON STAFF OF N.P.T.A.

A. R. Jackson, formerly sales manager of the Nekoosa-Edwards Paper Company, is now secretary of the Wrapping Paper Division of the National Paper Trade Association. He succeeds Mr. Spaulding in the executive position. Mr. Jackson is returning to the paper industry for active work after a long rest following his retirement a few years ago from the Wisconsin mill's executive staff.

◆

GREEN BAY MAKES READY FOR TAPPI

Plans are now being made for an outstanding meeting of the Technical Association of the Pulp and Paper Industry at Green Bay, Wisconsin, September 8-10, 1938. A. B. Hansen, general manager of Northern Paper Mills, is general chairman for the meeting. He will be assisted by W. J. Servotte, assistant manager, Bay West Paper Company; W. C. Christensen, chief chemist, Hoberg Paper Mills, and E. H. Voightman, chemical engineer, Kimberly-Clark Corporation.

Headquarters for the TAPPI meet will be at the Northland Hotel, Green Bay, although rooms in all of the hotels in the city have been reserved by the Association. Early reservations can be made at present through A. D. Murphy of the Green Bay Association of Commerce.

Of interest to many members of TAPPI will be the meetings of the Cellulose Division of the American Chemical Society, which group is holding its convention at Milwaukee, Wisconsin, September 5-9. The divisional meetings of the society will probably be held prior to the TAPPI meeting. Football fans will be delighted to know that on September 11, the day after the TAPPI meeting, the Green Bay Packers will play Cleveland at Green Bay. The Packers were national professional football champions for several years.

Excellent provisions are being made for the exhibition of machinery and paper mill supplies at the Northland Hotel during the convention. Early reservation of space will result in obtaining the choice locations, it is urged. R. D. Cords, of Northern Paper Mills, will have charge of exhibits.

◆

PACIFIC COAST ASSOCIATIONS MEET JOINTLY

The Pacific Coast Section of TAPPI and the Pacific Coast Division of the American Pulp and Paper Mill Superintendents Association met jointly June 4 in Portland, Ore. M. W. Coster of the Soundview Pulp Company, Everett, Wash., was elected chairman of TAPPI. W. T. Webster of the St. Regis Paper Company, Tacoma, was named vice chairman; J. V. B. Cox of the Hercules Powder Company, Portland, secretary-treasurer, and George H. McGregor, retiring chairman, and Carl Falstrom, both of Longview, Wash., members of the executive committee. Mr. McGregor is with the Weyerhaeuser Timber Company and Mr. Falstrom with the Longview Fiber Company.

◆

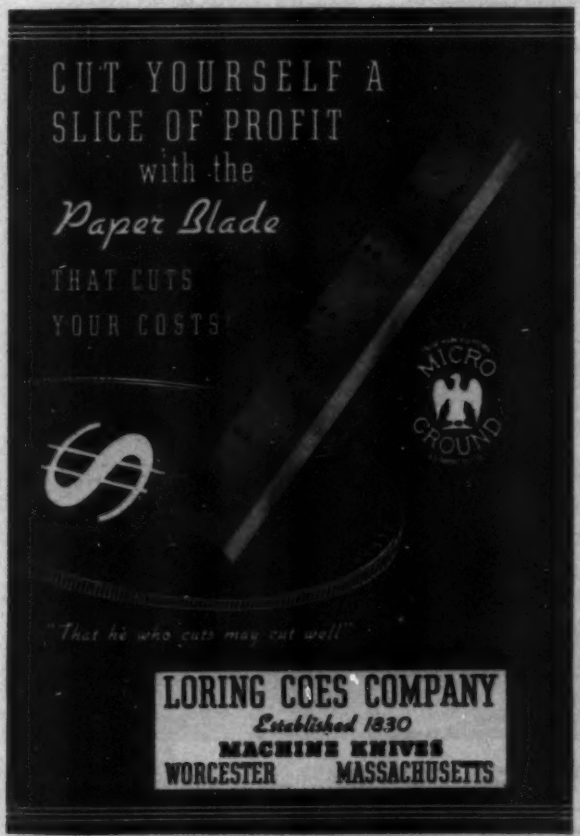
▶▶▶ THE NEW YORK PAPER TRADE ASSOCIATION, in the joint interest of the mills and the merchants, has started a move to standardize the size of sample books and filing cabinets, working through a committee of which Adolph Warshow is chairman. At present, the sentiment is in favor of a 6x9 sample book instead of the variety of sizes now in vogue.

APPLETON *wires are* GOOD WIRES

MONO-PLANE WEAVE
PHOSBLOY WIRES
APPLWELD

APPLETON WIRE WORKS. INC.
APPLETON, WISCONSIN

CUT YOURSELF A SLICE OF PROFIT with the *Paper Blade* THAT CUTS YOUR COSTS



"That he who cuts may eat well"

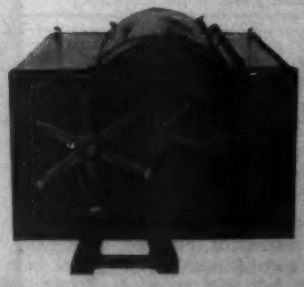
LORING COES COMPANY
Established 1830
MACHINE KNIVES
WORCESTER MASSACHUSETTS

The A. D. Wood Machine

PULP THICKENER — WASHER — SAVEALL and WATER SCREEN

No Couch Roll or Doctor. Handles variable flows and consistencies. Equipped with patented Double Sealing Collars. Efficient, economical and practically automatic.

Over 30 installed in 1937.



GLENS FALLS MACHINE WORKS, Inc.
GLENS FALLS, N. Y.

Ask for descriptive Bulletin

ALLIED

Nashua Has New Office

COMBINING all the attributes of objective beauty with the maximum provision for modern comforts and conveniences, the new office building of the Nashua Gummed and Coated Paper Company, Nashua, New Hampshire, was formally dedicated May 3 by Winthrop L. Carter, president of the company. The ceremony included the unveiling of two tablets set up in the lobby of the building as a memorial to the late James Richard Carter, to whom the new structure was dedicated.

"In the conception of this building there were three fundamental purposes," said Mr. Carter in his dedicatory address. "First, that the building should be so designed as to space to make possible the greatest efficiency in the performance of the office functions of the company; second, that the engineering design of the building should be such as to provide comfortable and hygienic working conditions and third, that the beauty of one's surroundings might add to one's personal joy in working in such a place."

The new building, which is of the most modern architecture, seems to have been erected exactly according to Mr. Carter's conception, for from both the viewpoints of style and utility it is complete. It is located to the west of the company's factory on Franklin Street and is connected with the factory by an overhead enclosed walk. It is two stories high, of brick and glass construction, and is reputedly the first office building in New England to be completely equipped with the new glass wall bricks. Cellar walls are reinforced concrete while the upper walls are of black brick up to the first floor windows, then of Fiske gray brick to the roof. The large panels in the wall are

HOLYOKE PAPER CONCERNS GIVEN AWARD OF MERIT

Merit awards for excellence in the manufacture of a particular product were won by four Holyoke paper concerns, the National Blank Book Company, Judd Paper Company, Marvellum Company, and the Hazen Paper Company. These awards were presented by the Employers' Association of Western Massachusetts, and the Associated Industries of Massachusetts.

The annual display of this association was held in Springfield, Mass., recently. The National Blank Book Company had a display in which it showed its eye ease paper and its ring book with new lock lever which opens, closes, and locks rings, and prevents sheets from spilling. The Judd Paper Company's booth displayed its twin pocket label, for which the company earned the merit award. The late C. K. Judd devised the twin pocket envelope and the label is an improvement on it.

◆

STAUNTONS, LTD. PLAN ADDITION

Stauntons, Ltd., a subsidiary of Canadian Wallpaper Manufacturers, Ltd., will soon erect a new addition to its recently completed original building in Leaside, a suburb of Toronto. The new addition will be two stories high and will be constructed of reinforced concrete with brick and tile walls and mastic floors. The original plant was erected at a cost of $400,000 and embodies many features of design and equipment for modern industrial buildings.

SET-UP BOXES DISPLAYED

Part of the exhibit of set-up boxes now in the display room adjoining the offices of the Container Corporation of America in the Graybar Building, New York, is shown on this page. Outstanding products of 16 eastern set-up box manufacturers are included in the show. Although Container Corporation itself does not make set-up boxes, it manufactures, among other products, boxboard used in this type of package. Some of the display compartments shown in the picture have backgrounds made of Concora boxboards in three shades, black, brown and tan. These have been applied to the wall in geometric design, creating an interesting contrast to the untreated walls of other compartments, as well as to the colorful boxes on display. A modern abstraction, executed in vari-colored boxboards, corrugated strawboard, fiber boards and pulp, occupies a wall of the display room not shown in the photo. This is the work of Katherine Chandler, assistant art director of Container Corporation. Attractive murals by Wayne Colvin depict the various steps in the manufacture of paperboards and their fabrication into cartons.

The products of 16 eastern set-up box manufacturers are shown in this exhibit now in display room adjoining the offices of the Container Corp. of America, New York. Note the murals around the wall which depict the various steps in the manufacture of paperboards and their fabrication into cartons.

COMING EVENTS

June 20-22—Annual Meeting, Society of Chemical Industry, Ottawa, Canada.

June 22-24—Annual Meeting of American Pulp and Paper Mill Superintendents Association, Royal York Hotel, Toronto, Ontario.

June 23—General Meeting, Book Paper Manufacturers Association, Waldorf-Astoria, New York, N. Y.

Sept. 5-9—American Chemical Society meeting, Milwaukee, Wisconsin.

Sept. 8-10—Technical Association of the Pulp and Paper Industry, Fall Meeting, Northland Hotel, Green Bay, Wisconsin.

Sept. 19-23—Seventh International Management Congress, Washington, D. C.

Oct. 10-14—National Safety Congress, Stevens Hotel, Chicago.

For Sale—Paper Machinery

Paper Machines: 72 in., 126 in.

Experimental Fourdrinier Paper Machine with wire 46 in. by 50 ft., 2 presses, Minton vacuum dryer, worn gear drive.

Calender Stacks: 116 in., 114 in., 104 in., 100 in., 90 in., 88 in., 84 in., 76 in.

Super Calenders: 44 in., 72 in., motor driven.

Sheet Cutters: 72 in., 94 in., 108 in., 136 in., duplex with or without layboys; single: 44 in. to 100 in. (20 cutters and layboys).

Slitters: 60 in. Cameron, 60 in. Kidder.

Trimmers: 2-50 in. Seybold.

Dryers: Several hundred, from 42 in. to 100 in. face.

Fourdrinier Part: Late type, Moore & White, takes wire 80 in. by 50 ft., with Voith inlet and suction couch.

Jordans: 3 Jones, 2 Emersons, 2 Appleton.

BEATERS—PUMPS—ROLLS—REEVES DRIVES

Write to us when you want to sell Paper Mill Machinery

FRANK H. DAVIS CO.

175 Richdale Avenue, Cambridge, Massachusetts

RYERSON

Uniform High Quality—at No Extra Cost

The Ryerson Certified Steel Plan gives you definite assurance of getting steel which has the features most desirable in the particular kind you order. When you need steel of any kind, draw on the nearest Ryerson plant. Immediate Shipment is assured.

Bars, Shapes, Structurals, Rails, Plates, Sheets—Strip, Rivets, Bolts — Shafting, Tubing, Boiler Fittings, Concrete Reinforcing — Welding Rods, Solder, Stainless Steel, Babbitt Metal — Alloy Steel, Tool Steel, Floor Plates, Safety Treads

Write for the Ryerson Stock List

Joseph T. Ryerson & Son, Inc., *Plants at:* Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Jersey City, Philadelphia, Boston

Certified STEELS

RYERTEX BEARINGS

—CLEANER —LAST LONGER

They are water lubricated« »Consume less power« »Help produce cleaner stock« »Quickly replaced« »Will run submerged in pulp stock« »Last longer« »Practically unaffected by acid solution. *Write for Bulletin 42*

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Jersey City, Philadelphia, Boston

RYERSON

THE RUST ENGINEERING CO.

CLARK BUILDING

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SPECIALIZE IN

CONSTRUCTION

COMPLETE PULP AND PAPER MILLS

INDUSTRIAL PLANTS

POWER PLANTS

BRICK AND CONCRETE CHIMNEYS

CHEMICAL LINING ENGINEERS INC.

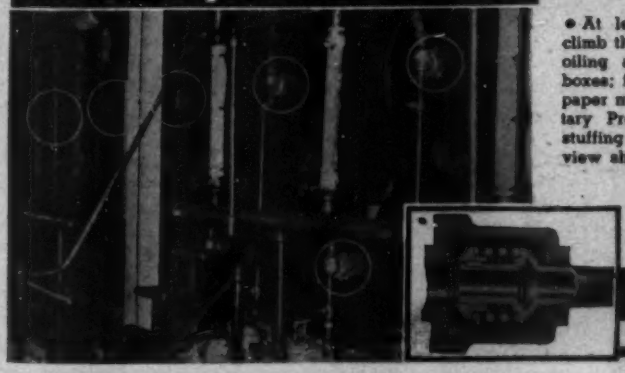
ACID AND ALKALINE CHEMICAL RESISTING LININGS

Delivered - Installed - Guaranteed

832 Builders Exchange

MINNEAPOLIS, - MINN.

These are good stairs — but — THEY WON'T BE NEEDED NOW!



• At least no one will need to climb them for inspecting, packing, oiling and adjusting the stuffing boxes; for this is one of the many paper machines where Johnson Rotary Pressure Joints have ended stuffing box troubles. The sectional view shows the basic construction of these Johnson Joints. Two special, self-lubricating carbon graphite rings form the bearings and pressure seal. Sealed by the pressure, they are self-adjusting. Equally important is the ball and socket design and the annular space around the outlet which provides for angular or lateral misalignment —greatly increasing joint life.

There is a Johnson Joint for every machine with every type of drainage—a joint that will save time, power, and step up production. Ask for latest bulletins.

THE JOHNSON CORPORATION

845 WOOD STREET — THREE RIVERS, MICH.

filled with glass blocks which give perfect light but do not have the disadvantage of heat. The floor of the lobby and the stair treads are of Terrazzo.

Air-conditioning forms a major part of the new building's modern setup. The building is divided into five sections so that each section can be supplied with air at a reasonable temperature for that particular section. The ducts for incoming air run north and south and the exhaust ducts run east and west. The mechanical equipment for the ventilating consists of a Sturtevant air washer and a Kompak air filter. The air can be changed six times an hour if necessary.

Another important feature of the new building is the sound-proofing, all ceilings having been covered with Johns-Manville acoustical tile. This latter, combined with the ideal ventilating system, are two features designed to add materially to office comfort and efficiency.

The major portion of the first floor is devoted to general files and the sales department. Here also, are located the lavatories for men and women and the women's rest room, the latter being furnished with chrome and fabrikoid furniture. The cost department is on this floor and here also can be found attractive display racks for the company's paper products.

Offices of the company executives are on the second floor as are the order, credit, accounting, planning and inventory, payroll and traffic, as well as tabulating departments. The vault and sales department are also located on the second floor, in addition to the offices of the purchasing department.

The building, like the factory addition, was constructed by the Morton C. Tuttle Company and was designed and planned by company officials.

Exterior view of Nashua's new office building.

Winthrop L. Carter President.

Corner of general office.

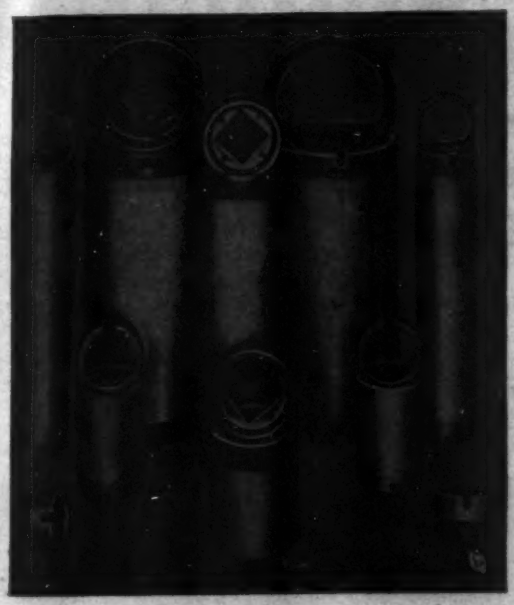
One of display cabinets showing Nashua products in use.

C-Z CORP. BUYS NEW OFFICE BUILDING

The Crown Zellerbach Corporation has purchased half a block of property in Portland, Ore., including a seven-story office building, to house the Sales Division of the Zellerbach Paper Company, it was announced recently by W. D. McWaters, manager of the Portland branch.

Half of the property is occupied by the building. On the remainder a two-story concrete warehouse and shipping department will be erected.

A. E. Breyman and Isadore Zellerbach of San Francisco closed the deal, with the aid of J. R. Frum, Portland, real estate agent of the Crown Zellerbach Corporation.



ELIXMAN

CAPS

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all standard sizes.

Heavy duty caps with re-enforced square hole. This patented feature of re-enforcement gives added strength and durability.

CORES

Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, Inc.
CORINTH, N. Y.

J. W. HEWITT MACHINE CO., Inc.
Neenah, Wisconsin
Builders of
Paper Making Rolls and Special Machinery
Roll Grinding a Specialty

MISCO "C"
THE CORROSION RESISTANT ALLOY
CAST • ROLLED • FABRICATED
for all equipment exposed to corrosion by sulphite acids
MICHIGAN STEEL CASTING CO., DETROIT, MICH.

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ENGLISH ECCO CLAYS TRADE MARK **CLAYS**

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

SAFETY

GREEN BAY DRAWS STATE'S LARGEST SAFETY GATHERING

THE safety theme was messaged to some 2,500 men and women by numerous speakers at Green Bay, Wis., on May 26 when the Fox River Valley and Lake Shore Safety Conference held its eleventh annual meeting. The attendance was estimated to be the largest ever held at a Wisconsin safety gathering.

The delegates voted Sheboygan host city for the 1939 meeting.

The general session was presided over by Joseph M. Conway, president and general manager of Hoberg Paper Mills, Inc., Green Bay. He welcomed the delegates and praised their efforts in the cause of human safety.

At the Paper and Pulp Section meeting in the afternoon, attracting nearly 300 persons, E. D. Stoetzel, director of industrial relations of Marathon Paper Mills, Rothschild, Wis., discussed "Safety is a Dry Subject," in which he urged the injection of human interest stories in safety teachings, and proposed to let the individual worker and employee work out safety problems so that he would become more familiar with them and realize the importance of safety vigilance.

The subject "Safety—Practicality or Sentimentality" was chosen by the other main speaker, J. J. Plazk, claims manager and personnel director of Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis. The speaker said there are sentimental values attached to safety, but he argued that the safety program should be taught from the practical viewpoint.

Richard W. Mahoney, personnel director of Appleton Coated Paper Company, Appleton, Wisconsin, presided as chairman of the section meeting. An industrial safety sound movie, "Lady Luck's Husband," was featured on the program through the courtesy of the National Industrial Council.

Other Green Bay men taking part at the conference included William Poirier, treasurer of Hudson Sharp Machine Company, who presided at the Metal Trades' Section meeting, and B. J. McClosky, personnel director of Hoberg Mills, who was chairman at

Left—Joseph M. Conway, general chairman, welcomes a crowd of nearly 2000 at the opening session of safety conference in Green Bay. Center—Lt. Gov. Herman L. Ekern, addresses safety delegates in his first public address since his appointment. Right—Richard W. Mahoney, chairman Pulp and Paper Section.

Speakers table (right) and a few of the 1300 who attended the banquet concluding the eleventh annual safety conference at Green Bay.

KNOWING HOW

. . . contributes much to the building of Dependable Paper Mill Vacuum Pumps

There is no substitute for experience. The acquired sense of how to go about the job is something that comes with years of close attention to details and contact with the problems involved.

As pioneers in building vacuum pumps for paper machines, this organization has experienced many applications and helped with the solution of many problems. You can benefit from this experience by consulting our representative for information—no obligation of course.

BLOWER CORP.
CONNERSVILLE, INDIANA

TOMORROW'S ENGINEERING APPROVED BY YESTERDAY'S EXPERIENCE

Sulphur Dioxide

- - - a better supply at lower cost!

IF you should use cooking liquor of higher SO_2 content than now available, this organization can modernize your present equipment at low cost, or furnish a new plant from sulphur or pyrites furnace and burner to pressure storage of fortified cooking liquor—complete and to meet your individual requirements.

Our improved system for complete and independent reclamation of SO_2 from digester relief gas, and for simultaneous building up of the SO_2 into finished acid of previously unobtainable strength not only is independent of raw acid production, but also coordinates with our digester circulating process which improves the whole pulp-producing operation.

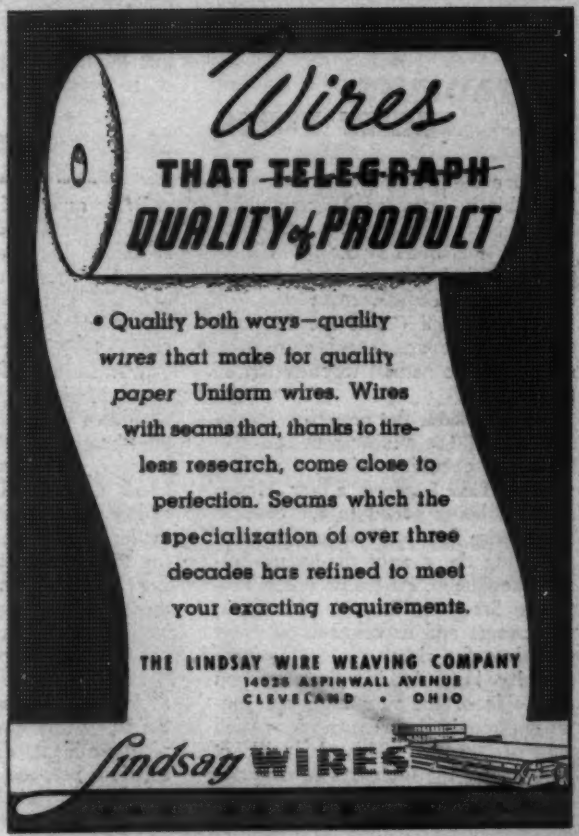
Let us submit suggestions, costs and proof of superior performance

CHEMICAL CONSTRUCTION CORPORATION

CHEMICO

Consulting, Contracting and Erecting Chemical Engineers

30 Rockefeller Plaza, New York


Wires
THAT TELEGRAPH
QUALITY of PRODUCT
• Quality both ways—quality wires that make for quality paper Uniform wires. Wires with seams that, thanks to tireless research, come close to perfection. Seams which the specialization of over three decades has refined to meet your exacting requirements.
THE LINDSAY WIRE WEAVING COMPANY
14020 ASPINWALL AVENUE
CLEVELAND • OHIO
Lindsay WIRES

When this photograph (above) was taken, a sound movie, "Lady Luck's Husband," was being shown before a meeting of the Pulp and Paper Section. (Inset)—Headline speakers compare notes before appearing on the program. Left—E. D. Stoetzel, director of industrial relations at Marathon Paper Mills, Rothschild, Wis., and J. J. Pisak, claims manager and personnel director of Consolidated Water Power and Paper Company, Wisconsin Rapids, Wisconsin.

the personnel and safety directors luncheon.

Highlight of the one-day conference was the evening banquet, at which James H. Gheen, New York, addressed a crowd of 1,300 on the topic, "Playing Safe."

◆

CANADIANS FIGHT FIRES

A new program of forestry control has been started this year in British Columbia under authority granted by the Legislature of the province. The plan has two main aspects: (1) Getting rid of slash property to remove the fire menace and make way for new forests, and (2) to see that seed trees are left and every encouragement given to natural regeneration of the big firs.

To give better fire protection to the Little Long Lac mining area and also to timber operations along the north shore of Lake Superior, a new Stinson plane is being added to the Ontario Air Service fleet in Thunder Bay area.

During the current fire-hazard season, the Quebec Provincial Forest Protection Service will make several improvements and experiments in order to reduce fire risks.

It has been decided to reserve on each side of the new highways running through the forests, a wooded zone of 200 feet. This plan will not only permit the highways to maintain their attractiveness for the tourists but will also avoid, to a certain extent, the fire risk caused by left-over slashings. Posters will be placed along these highways forbidding the cutting of trees within a strip of 200 feet. It is also the intention of the Service to prepare in advance, sites where pumps may be speedily installed in case of fire so that fire-fighting organizations may be set to work without loss of time.

◆

K-C STAGES ALL-DAY SAFETY MEET

Every aspect of safety was emphasized at the all-day safety program sponsored by employees of the Kimberly-Clark Corporation's mill at Kimberly, Wis., on May 5, as the entire community participated in the events held in the village clubhouse.

Wisconsin's chief executive, Governor, Philip F. La Follette, had been scheduled to speak, but could not attend because of illness. F. J. Sensenbrenner, president of the Kimberly-Clark Corp., delivered the principal address in the Governor's stead. Mr. Sensenbrenner analyzed factors leading to the business depression, pointing to numerous legislative experiments which have retarded recovery because they have interfered with orderly business processes.

H. G. Boon, general superintendent, spoke on "Management's Part in Safety," while Ernst Mahler, executive vice president, discussed harmonious relations between the company and its employees. Cola G. Parker, vice president, pointed out the wisdom of using tried methods, and S. F. Shattuck, vice president, spoke on teamwork as the primary factor. H. A. Klemm, of the Wisconsin Industrial Commission, Madison, Wis., lauded the company and the community for their safety endeavors.

As part of the program, various mill departments erected booths in the clubhouse showing examples of safety.

◆

▶▶▶ ALBERT OILSCHLAGER, 37, paper machine oiler at the Port Edwards (Wis.) division of the Nekoosa-Edwards Paper Company, was killed recently while oiling a clutch. Oilschlager was alone at the time and company officials believe that while a guard was open, the safety device broke loose and struck him on the forehead.

◆

TROPHY GIVEN "SAFEST MILL IN CANADA"

The Class A trophy, premier award in the "Safest Mill in Canada" contest, was presented to the Anglo-Canadian Pulp and Paper Mills recently at a banquet to the Safety Committee at the Chateau Frontenac, Quebec. The presentation was made by J. N. Stephenson, editor-in-chief of the *Pulp and Paper Magazine of Canada*, which journal makes the awards annually in the contest. The trophy was received on behalf of the company by R. A. McInnis, managing director, and delivered by him to E. Baronet, safety inspector.

The Class B trophy for 1937 was won by the Lybster division of the Alliance Paper Mills, Merritton, Ontario and this award was also presented by Mr. Stephenson. The occasion for the presentation was a dinner dance on May 5 which was attended by about 200 people. Plant Manager A. E. H. Fair presided.

◆

ALL-OHIO CONGRESS

S. F. Whitesel, of the Franklin Board & Paper Company, Franklin, Ohio, was elected chairman of the Paper and Pulp Section of the All-Ohio Safety Congress held in Columbus, May 10-12. R. W. Richardson, of the Gardner-Richardson Company at Lockland, Ohio, was named first vice-chairman and S. S. Kniesly, of the Hinde & Dauch Paper Company, Sandusky, was elected second vice-chairman. Lloyd Haggard, of the Champion Paper & Fibre Company at Hamilton, was chosen secretary of the group. Approximately 50 safety engineers and directors, personnel directors, foremen and workmen attended sessions of the Paper and Pulp Section.

The Paper Industry Safety Contest

July 1, 1937 to June 30, 1938

Cumulative Scores as of April 30

10 Mills Have Perfect Record

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
A			
B			
C	Finch Pruyn & Co., Inc.	Glens Falls	New York
D	Bird & Son, Inc.	Phillipsdale	Rhode Island
	Rogers Fibre Co., Inc.	Bar Mills	Maine
	Hollingsworth & Whitney Co.	Aroostook & Cobbossee Mills	Gardner, Maine
	The Mead Corporation	Nashville	Tennessee
	International Paper Co.	Mill No. 23	Riley, Maine

Division II—Paper and Board Re-Manufacturing

Bird & Son, Inc.	Chicago	Illinois
Texas Corrugated Box Co., Inc.	Dallas	Texas
Bay West Paper Company	Green Bay	Wisconsin
Bemis Bros. Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP A	P-139	1	1	.746
	P- 44	2	2	1.476
	P- 19	3	4	3.651
	P-106	4	10	4.369
	P-121	5	7	4.796
	P- 13	6	5	5.687
	P- 84	7	10	6.006
	P- 30	8	8	6.630
	P- 12	9	9	6.664
	P- 28	10	26	6.731
	P- 1	11	18	7.133
	P- 10	12	9	7.139
	P- 21	13	10	8.316
	P- 18	14	16	8.730
	P-136	15	13	9.701
	P- 89	16	16	10.006
	P- 97	17	12	10.420
	P- 9	18	26	11.073
	P- 11	19	13	11.891
	P- 42	20	21	11.919
	P- 23	21	14	12.990
	P-102	22	20	13.740
	P- 73	23	32	14.040
	P- 27	24	51	14.163
	P- 67	25	37	16.089
	P- 94	26	22	18.793
	P- 40	27	48	27.319
	P- 87	28	52	28.265
	P- 71	29	43	34.752
	P- 32	30	47	36.679
	P-140	31	54	39.080
GROUP B	P- 22	1	2	2.226
	P-135	2	2	2.581
	P- 72	3	3	4.469
	P-133	4	5	5.868
	P- 4	5	4	6.243
	P- 68	6	6	6.354
	P- 60	7	6	6.595
	P- 58	8	6	7.183
	P-143	9	6	9.320
	P- 70	10	6	9.443
	P-142	11	7	10.010
	P- 2	12	11	12.122
	P-122	13	10	12.265
	P- 50	14	9	12.389
	P- 15	15	10	13.476
	P-128	16	11	13.807
	P- 26	17	12	14.352
	P- 45	18	11	14.537
	P- 16	19	11	15.302
	P-107	20	15	15.391
	P-113	21	14	15.521
	P-123	22	13	17.326
	P- 3	23	16	18.385
	P-137	24	13	19.187
	P-120	25	15	20.413
	P- 25	26	20	21.502
	P-124	27	15	23.974
	P-130	28	25	26.851
	P- 83	29	21	29.365
	P-104	30	26	35.882

April Report Missing—covers nine months only:
P-10, P-27, P-82, P-14.

	Key Number	Rank	Disabling Injuries	Frequency Rate
GROUP C	P- 55	2	1	1.886
	P- 89	3	2	4.490
	P- 43	4	3	8.330
	P-119	5	5	9.304
	P- 88	6	5	9.534
	P- 61	7	5	11.213
	P- 37	8	5	11.671
	P- 94	9	5	15.604
	P- 52	10	7	17.408
	P-133	11	7	17.502
	P- 46	12	10	19.276
	P- 14	13	7	25.638
	P-105	14	9	27.986
	P- 47	15	10	28.453
	P- 33	16	12	30.231
	P- 48	17	10	30.440
	P- 41	18	10	33.770
	P- 29	19	14	34.548
	P -34	20	15	37.406
	P-111	21	19	41.235
	P- 17	22	16	48.790
	P- 80	23	18	50.881
GROUP D	P- 5	6	1	4.017
	P- 90	7	1	6.775
	P- 86	8	1	7.004
	P-141	9	1	8.721
	P-117	10	2	9.846
	P- 50	11	3	13.249
	P- 98	12	2	13.372
	P-110	13	1	13.510
	P-129	14	3	13.664
	P-125	15	2	13.977
	P- 35	16	2	14.678
	P-106	17	4	17.676
	P- 91	18	5	18.227
	P-134	19	4	18.842
	P- 99	20	3	19.606
	P- 49	21	4	20.651
	P- 7	22	5	21.384
	P- 6	23	5	21.649
	P- 42	24	4	21.970
	P- 63	25	5	23.201
	P- 98	26	4	22.366
	P-138	27	5	23.087
	P-116	28	5	27.185
	P- 38	29	6	28.603
	P- 81	30	7	31.021
	P- 28	31	3	34.990
	P- 65	32	5	42.734
	P-131	33	5	47.493

Division II—Paper and Board Re-Manufacturing

R- 2	5	1	1.534
R-23	6	3	3.786
R-20	7	5	5.980
R-19	8	2	6.873
R-13	9	2	7.427
R-21	10	4	8.021
R-10	11	6	13.316
R-11	12	2	17.544
R-27	13	6	17.569
R-28	14	9	19.385
R-24	15	8	19.838
R- 9	16	5	24.252
R- 1	17	11	25.461
R-26	18	12	34.419
R- 4	19	5	61.476

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UNDERGROUND for water supply or disposal lines, Armco pipe retains its high flow capacity, eliminates costly breaks and leaks. Diameters run from 6 to 36 inches; wall thicknesses from 12 gage to ½-inch. Address inquiries to The American Rolling Mill Company, Pipe Sales Division, 2121 Curtis Street, Middletown, Ohio.

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FRANKLIN MEMORIAL

Paying tribute to one of the greatest of American citizens and to a man who, incidentally, was largely responsible for the development of the graphic arts in this country, thousands of men and women gathered in Philadelphia, May 19, to witness and aid in the dedication of the new Benjamin Franklin Memorial at Franklin Institute.

It is interesting to note that Franklin's success as a scientist and statesman was based on the successes he achieved in the printing field and hence, to commemorate this aspect of Franklin's life, the Institute has built a Graphic Arts Section which contains three departments devoted to papermaking up through 4-color printing. Located in this section is a miniature papermaking machine, manufactured especially for the Franklin Institute by Rice, Barton & Fales, Inc. It is a complete scale working model that will actually produce various kinds of paper 8½ inches wide and is wired completely in conduits with a panel on which are mounted the control units and safety switches.

The Franklin Institute, founded in 1824, has a record of more than a century of distinguished service in the promotion of science and the mechanic arts. It has awarded its coveted Franklin Medal to such benefactors of humanity as Edison, Bragg, Marconi, Modjeski, Einstein, Millikan and Kettering.

◆

OLD TEXTILE MILL HOUSES BOX CO.

Until a new building is finished on the site of the factory destroyed last winter, the Wilson Box and Lumber Company, Fairville, New Brunswick, will occupy temporary quarters in an old abandoned cotton mill in St. John, N. B. The second and third floors of the structure have been fitted up for the manufacture of corrugated paper boxes and cartons.

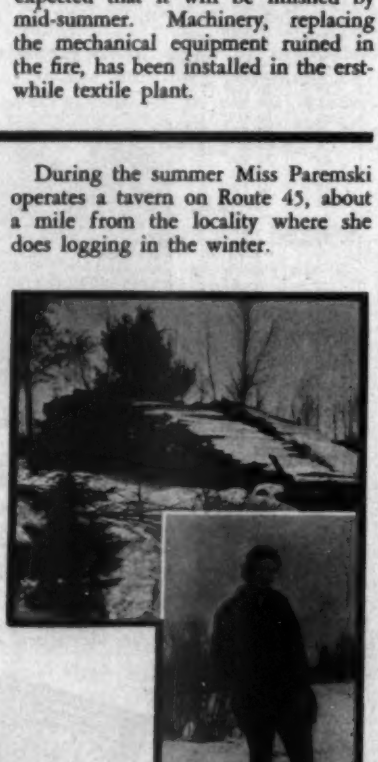
Work on the construction of the new building has been started and it is expected that it will be finished by mid-summer. Machinery, replacing the mechanical equipment ruined in the fire, has been installed in the erstwhile textile plant.

WISCONSIN'S WOMAN LOGGER

Meet Miss Rena Paremski of Three Lakes, Wisconsin, who is believed to be the only large-scale woman pulpwood operator in that state. Last winter she completed her first successful winter at logging. Using a team of horses, she skidded pulpwood and larger logs out of the woods to tote roads. Men watching her work were amazed at her skill and strength. She worked from 5 a. m. until dark each day, often longer hours than most men engaged in the same line of work.

Miss Paremski set a record by working daily throughout the winter—breaking off only on election day to vote. She writes "This may be unusual work for a woman, but to me it is as easy as housework."

During the summer Miss Paremski operates a tavern on Route 45, about a mile from the locality where she does logging in the winter.



Close-ups

CORRECTION

On page 22 of the May, 1938 issue of *Paper World*, an item headed "AWP Lab. Studies Rubber in Pulp," contained the statement that representatives of the du Pont company had been working with the laboratory force of the American Writing Paper Company, Holyoke, Mass., in an effort to solve the problem of rubber in rag stock. This information as submitted for publication was found to be in error, as the chemists who carried on this research at the Holyoke laboratory were from the Hercules Powder Company.

▶▶▶ TROUT FISHERMEN are protesting against the drive of pulpwood down the Nipigon River in northwestern Ontario, claiming that the proposed drive of 60,000 cords of pulpwood this year would ruin the finest trout stream in the world.

◆

▶▶▶ DR. THOMAS N. BARROWS, president of Lawrence College and director of the Institute of Paper Chemistry, Appleton, Wis., described the rapid growth and functions of the Institute in a recent address before the Rotary Club of Kaukauna, Wis. In 1930, he stated, the Institute was started with three students and five staff members. At present, there are 44 students and a staff of 85. At the beginning, the annual budget was $40,000. This has grown to $300,000, Dr. Barrows said. More than 300 paper mills, operated by 62 companies, are members.

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▶▶▶ NATIONAL CONTAINERS CORPORATION, LTD., has been incorporated in Toronto, Ontario. The capitalization comprises 80,000 shares of stock. All types of paper boxes and containers will be manufactured, and other paper products will be bought and sold.

◆

▶▶▶ THE NEW FOREMEN TRAINING SERVICE inaugurated by MacVeagh & Co., Inc., 630 Park Avenue, New York, and outlined in the May, 1938, issue of *The Paper Industry*, is now being distributed throughout New England by Lincoln Baylies, 48 Franklin Street, Boston. Distribution of the service throughout the rest of the country is now being accomplished by Modern Talking Picture Service, Inc., 9 Rockefeller Plaza, New York City.

RELATED INDUSTRIES

CHENEY-BIGELOW HAS 2 NEW LOOMS

THE Cheney-Bigelow Wire Works of Springfield, Mass., recently installed two new Jaeger-type looms which are now in production. The decision to install these looms was made after a prolonged investigation of all sources here and abroad, according to company officials. A large number of this make of loom are now in use in Europe, two of the largest looms in the world being of the same type.

The looms installed in the Cheney-Bigelow plant are 244 inches and 180 inches respectively. The large loom weighs 57 tons while the smaller one weighs 48 tons. Massive foundations were built to support these tremendous weights. Due to the heavy foundations and the weight of the looms themselves, practically all vibration has been eliminated.

The blow which places each shute wire in position is a very soft, or light squeeze, which can be perfectly controlled. It can be regulated with exactitude to be suitable for the particular cloth that is being woven, that is, depending upon mesh and the size of the wire being used. The lay, which is that part of the loom making the blow, is mounted with four places of contact, or support, instead of the customary two. It is of such construction that there can be no deflection and as a result, the shute wires are perfectly straight and the edges of the fourdrinier wire have a lessened strain on them, which should mean definitely better edges. In addition, the improved mounting of the lay makes for better uniformity and control. When the shuttle travels back and forth in placing the shute, it goes between the warp wires and these are supported in such a way that no strain can be placed on them.

The blow is one of the most important factors. Being of the character described, any strains on the wires are minimized, thus preventing hardening. This preserves the original life and strength of the wire.

In weaving, these looms develop a more pronounced crimp in the shute wires, an outstanding improvement in itself because this allows the warp knuckles to be slightly lower and increases the wearing life of the fourdrinier wire. Simple adjustments are provided so that different meshes can be woven of the basket weave or standard weave types, the finest and coarsest meshes, and meshes can be made in various weights of wire.

As the cloth is woven, it is sprung automatically and uniformly, resulting in a better job in this operation. An extra handling of the fourdrinier wire is avoided after it comes from the loom. These machines are highly automatic with shut-offs in case anything goes wrong. The many improvements on the looms, including the automatic features, result in more continuous work since there are few stops for adjustments. By elimination of the strains on the wires, there is less tendency for the wire to crystalize and hence a most superior fourdrinier wire is turned out by the looms. *(See illustration of looms on page 256.)*

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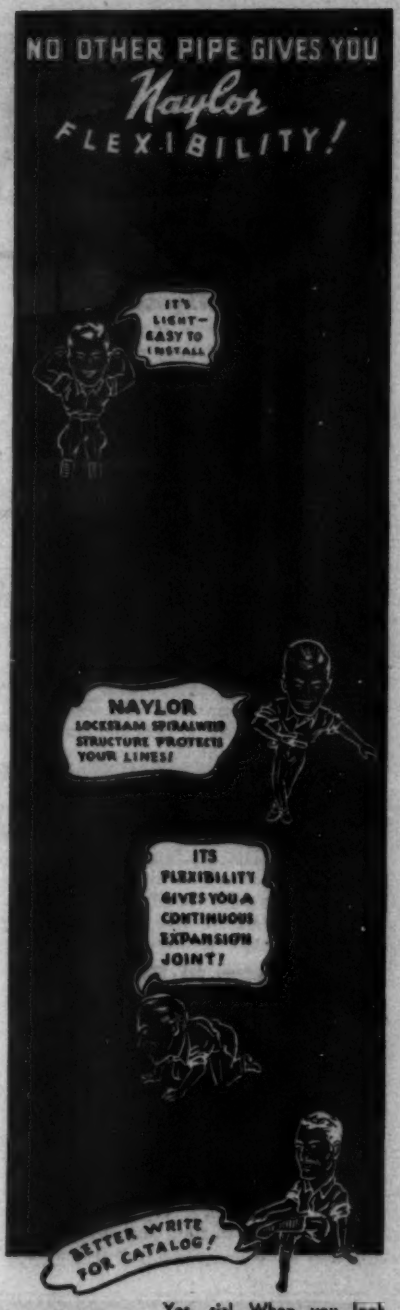
DOMINION ENGR. INSTALLS NEW ROLL FOUNDRY

Another step in the development of the roll-making industry in Canada was marked recently by installation of a roll foundry by the Dominion Engineering Works. In 1935 the first air furnace was installed and rolls were made in the regular iron foundry, but due to the fact that roll making is highly specialized, it was decided last year to separate the two departments. Accordingly, the iron foundry at the Longueuil plant was re-equipped for the specialized manufacture of rolls and allied castings.

The foundry has a capacity of about 2,000 tons per year. Rolls up to 18 tons in weight can be made. This is a larger size than any used in Canada at the present time. Attached to the foundry is a completely equipped laboratory where all raw materials are analyzed, as are the finished rolls, and where tests are made on the metal.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NAYLOR LOCKSEAM SPIRALWELD STRUCTURE PROTECTS YOUR LINES!
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TECHNICAL DEVELOPMENTS

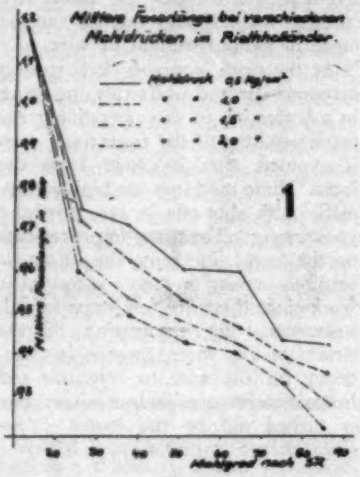
The following abstracts are of the latest developments found in the foreign press.

Pigmentary Dyestuffs for Paper

A record of Laboratory notes on experiments with syntheic or organic pigments [(1) insoluble dyes, (2) concentrated lake colors formed by precipitation as insoluble phosphates, molybdates and tungstates, (3) insol. Ca. or Ba. salts of monazo dyes, (4) vat dyes], their retention by bleached and unbleached sulphite, rag and esparto pulps and the methods used in their application. Nine variations in technique were recorded: (a) color alone; (b) color followed by rosin size; (c) color followed by alum, (d) color, size, alum; (e) color, alum, size; (f) size, alum, color; (g) size, color, alum; (h) alum, color, size; (i) alum, size, color. With certain pigments the order of addition has a marked effect. With others the variation is unimportant. Pigment pastes were used. Fastness to light and heat, acid, alkali, water and chlorine were investigated, as were the methods for determining the retention of the dye in the fiber. Retention experiments were only partly successful. Detailed tabulated data are given and for them the original article must be consulted since generalizations are difficult. J. Keaton. Paper-Maker and British Paper Trade J. 95, No. 4 (T.S.) 57-64 (1938).

The Degree of Beating

The reader is referred to a previous article (cf. *The Paper Industry*, March, 1938, 1453-5). In the present work, the author, using a Rieth hollander, and keeping the deg. Schopper Riegler constant while varying the beating or grinding pressure from 0.5 to 2.0 kg per cm², showed clearly that the mean fiber length decreases, the fiber slime content increases, and the felting properties are lowered as the pressure increases (for each deg. S.R. studied). The zero breaking lengths, and the breaking lengths of the pulp sheet strip also decrease with the pressure in beating. These deg. S.R. were 23, 37, 50, 65, 75, and 85. A careful analysis of the percentage of fibers of different lengths was made and tabulated. In Figure 1, the mean fiber lengths (Mittlere Faserlange) are plotted against the degree of beating, S.R. (Mahlgrad). Similar graphs are given for percentage slime content, "zero" breaking length and breaking length. In general, it is impossible to maintain definite grinding (or beating) pressures,



in most beaters. However, the Jockro mill is very satisfactory in this regard, and for such experiments as these recorded by the author, the Rieth hollander is also effective. The work indicates that the Jockro mill, the pebble mill and the Rieth apparatus have very similar effects on the fibers. A surface roughening, brooming, and in part, a shortening of the fibers was noted. This is indicated in Figure 2 showing the effect of a Rieth hollander beating to 70 deg. S.R. Figure 3 shows the effect of a stoneware beater (also at 70 deg. S.R.) Here some fibers have been subjected to deadgrinding, others have remained almost unchanged, while still others have been strongly defibrillated. In Figure 4 the effect of a beater (with metal blades on the beater roll) is apparent. The fibers are shortened, while defibrillation is very marked. These differences are reflected in strength tests in the pulp sheets. In the ordinary beater, breaking lengths are about 4400 m. less than when the Rieth hollander, Jockro or Pebble mills were used. E. Grund. Papier. Fabr. 36 (Tech.-Wiss. Tl.) 141-8 (1938).

Japanese Papermaking Fibers and Woods

This is the abstract of two articles, the first on the chemical composition of a grass termed Onigaya, growing wild in the Northeastern part of Formosa, and the second on a series of pulping studies on various Japanese hardwoods. Onigaya grows some 3 meters in its first year of growth and from 4 to 5 meters in subsequent years. It is 1 to 2 cm. in diameter. The stems contain nodes to the extent of about 17%, and node-free portions (83%) which consist of about 16% pith and 84% woody tissue. The highest cellulose content (47.9%) was found in this woody portion. The pith contained 40.2% cellulose and the nodes approximately 40%. The stem of Onigaya showed 21 to 23.9% lignin. The ash content of the stem (free from nodes) was 1.94% while the pith and nodes were somewhat higher in ash. Calculated as glucose, the hemicelluloses (obtained by 3.5 hour digestion with 5% hydrochloric acid) were 24.4% for the pith, and 18.8% for the woody tissue. However these were largely pentosans, since the pentosan determination showed 23.6% in the wood and 29.1% in the pith. These pentosans yielded, in the case of the wood, 10.7% arabinose and 89.3% xylose. In the case of the pith the corresponding figures were respectively 20.8% and 79.2%. Extensive analyses of the ash were made. It is 59% silica. The Onigaya fibers are soft, and are 2 mm. long and 15 microns in width. The hardwoods examined for pulping properties were Binuang, Nankaager, and Urajiroenoki. Of these, the latter was readily delignified by the use of magnesium and calcium bisulphite (using 1% of the MgO or CaO and 7 and 8% respectively of total SO_2). The

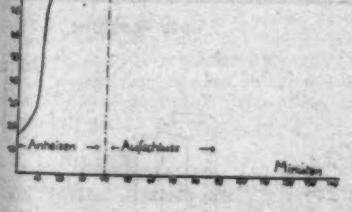
pulp quality is claimed to be equal to that of the first class softwood pulps used for rayon manufacture. The yields of bleached pulp was 44.2% (using magnesium bisulphite), and 40.3% (using calcium bisulphite). The former had an alpha-cellulose content of 93.5% and contained 4.68% pentosans. The latter showed corresponding figures of 93.3% and 2.9%. The wood of Urajiroenoki grows very rapidly in Formosa, and its bark contains about 20% tannins. First paper by K. Shinra, J. Soc. Chem. Ind. (Japan) 40, 353-9 (1937); second paper by M. Shikata, and K. Ogawa Cellulose Ind. (Japan) 13, 47-50 (1937) through Papier-Fabr. (Abstracts) 36, 56, and 53 (respectively) (1938).

Test for Lignosulphonic Acids

The best reagent for detecting lignosulphonic acid is trypaflavin (2, 6-dimethyl-10-methyl acridinium chloride) when 3 cc. of this reagent in 0.5 per cent solution is treated with 1 drop of waste liquor (representing 126×10^{-6} g. of lignosulphonic acid) a definite precipitate is obtained. Even with about ¼ this amount of lignosulphonate, a precipitate can still be noticed under a powerful hand lens. When sulphite liquor is heated on a metal spatula, or copper wire, a mercaptan odor is noted, and this test is approximately twice as sensitive as the trypaflavin precipitation. However, the latter is more sensitive than the fluorescence test. A number of other bases besides trypaflavin cause the precipitation of lignosulphonic acid, but none of them are as sensitive as trypaflavin. The authors also list 43 bases which do not precipitate lignosulphonic acid. Trypaflavin may be used as a reagent with chlorinated as well as unchlorinated waste sulphite liquors, and details are given for testing for lignosulphonates in soaps, soap-powders, and detergents generally, together with methods for the separation of interfering components. August Noll. Papier-Fabr. 36 (Tech. Tl.) 41-4 (1938).

Pulp from Flax Chaff

The reader is referred to an abstract on this same subject (*The Paper Industry*, April 1938, 89-91). In the present investigation, special stress was laid on the possibility of using the pulp in rayon manufacture. A review of the literature gives 50 references. Flax chaff, obtained by either



the dew-retting, or the ozone-retting processes showed the following analytical data: 43.2 to 44.3% crude cellulose, 35.2 to 36.2% alpha cellulose, 25.6 to 26.9% pentosans, 24.2 to 25.3% lignin, 2.13 to 2.83% ash (of which about 50% was silica) and 2.86 to 3.23% resins. Very evidently the analytical results are practically identical in the chaff obtained by either type of retting and this same finding obtains for delignification and for conversion to artificial fiber. After a long series of preliminary experiments the authors found that the following delignification appeared most satisfactory. The dust was removed and the chaff was washed. It was then treated for 1.5 hours at 97-100 deg. C. with 6% HNO_3, washed, extracted for one hour with 2% NaOH at 93-100 deg. C., and then bleached with hypochlorite. The bleaching depended on stock density and varied from 1 hour to 2.5 hours, and the concentration of chlorine per liter varied from 0.75 gram to 1.5 grams. Following this, the stock was treated in succession with 5% aqueous NaOH and with 1% HCl, both at room temperature. It was then washed and dried. The yield was about 27%. The illustration shows the HNO_3 cooking curve (temp. plotted against time). This pulp contained 97% alpha cellulose, 0.5% ash, 0.7% resins and showed a copper number of 0.6. (The authors refer to the methods used in all analytical determinations. The viscous obtained from such pulp compared very favorably in tear resistance (when dry and wet), extensibility, and in color with commercial samples of viscose. P. Eckert and K. Plaescheke. Papier-Fabr. 36 (Tech.-Wiss. Tl.) 113-9, 129-32 (1938).

FELTEX ·· A MATERIAL EVERY PAPER MILL CAN USE TO ADVANTAGE

MAGNUS FELTEX is a material used for the breaking-in, conditioning and cleaning of paper mill felts. It immediately and completely penetrates a felt, putting it in a soft and evenly absorbent condition. It is of such a nature that it does not form insoluble precipitates to load the fibres as commonly results when soap compounds are used and there is alum or hardness in the water.

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MAGNUS CLEANERS

Ratio of Wood to Acid in the Sulphite Cook

With an increasing ratio of wood to acid, there is a diminution in pulp yield when the cook is carried to a definite Roe number. The sugar content of the waste liquor increases. If the ratio of wood to acid is kept unchanged and the CaO content is the variable component, the pulp yield increases with increasing lime content of the cooking liquor, approximately 1% per 0.2% increase in CaO. This is accompanied by a decreasing sugar content in the waste liquor. Keeping the ratio weight of CaO to wood constant, the pulp yield increases with increasing concentration of lime in the sulphite liquor, provided the digestion time also increases. Up to a certain point, an increase in CaO content in the sulphite liquor causes an increase in pulp strength. However, the maximum (in the case of this series of experiments) was 5% CaO, and above this point the pulp strength appears to be independent of the percentage of lime. E. Hägglund and V. Ekman. Svensk Papperstidn. 41, 3-7 (1938), through C. A. 32, 2741 (1938).

Sheets of Ethyl Cellulose

The mechanical strength of the ethyl cellulose sheets studied was 6-7 kg. per sq. mm. The elongation was 20-25%. Cellulose acetate sheets have approximately the same resistance to light, and transparency, but have a slightly higher mechanical strength, and considerably lower elongation.

It PAYS TO USE MORE Spiral

● Look around your mill. There is a lot of heavy wrought pipe in it, isn't there? Now consider the fact that Taylor Spiral Pipe will handle all requirements except the most extreme pressures or the most extreme abrasion.

If your mill is like most mills, this will bring forcibly to your attention how many jobs are still being handled by heavy pipe that can be handled by Taylor Spiral at a tremendous saving.

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TAYLOR Spiral PIPE

Ethyl cellulose fiber is much more resistant to water than is cellulose acetate. Furthermore, the deterioration of ethyl cellulose fibers on standing in air (for 10 months) showed a less loss in mechanical strength than did cellulose nitrate or cellulose acetate. The decrease for ethyl cellulose films was 15-20%. The elongation of the films also decreased markedly. During that time there were practically no changes in color or general appearance, while cellulose acetate fibers kept under similar conditions turned cloudy and cellulose nitrate yellowed. If aging is carried out (in ethyl cellulose) for 150 hours at 50-60 deg., there is a lowering in mechanical strength. The action of ultraviolet light on ethyl cellulose (or prolonged exposure to air) seems to decrease the average size of the cellulose molecule. This is reflected in a lowered viscosity. S. N. Ushakov, I. M. Shneer, E. N. Demina and C. Ijboldina. Rev. gen. mat. plastiques, 13, 341-5 (1937) through C. A. 32, 3603 (1938).

Studies with a Sveen-Pedersen Save-All

The Pedersen flotation save-all used is shown in Figure 1. The waste water, treated with Sveen chemicals is introduced by suction pump (P) through pipe (L). Air is drawn in through tube (S) and the mixture enters the wind-boiler (W). The valve (V) regulates the pressure. Air becomes dissolved in the solution in (W). As soon as the mixture enters the open chest (K) of the save-all, any undissolved air escapes immediately, and the dissolved air is given off very gradually in the form of miniature bubbles, carrying particles of stock to the surface. This process is hastened through the agency of metallic baffle (B) in the front part of (K), and at the other end of (K) water runs off at the bottom, while the aerated stock is skimmed off by means of the scraping conveyer (Sch) into the channel (R). The authors go into detail regarding the colloidal pretreatment of the waste waters, the influence of pH, the composition of the size, and the influence of its age, and a comparison of the action of two different types of size (rosin size and Sveen-size) on backwaters containing loading materials. The optimum amount of size, point at which this size was to be added, and the effect of Sveen sizing on stock recovery in other types of save-alls was also studied (Sveen size consists of 10 kg pearl glue, 0.5 kg dry rosin, 0.1 kg 37% NaOH, 0.66 kg 14% papermakers alum and 0.5 kg (30%) formalin per 1000 liters of solution). The present authors find that not only is the Sveen technique very satisfactory in the Pedersen save-all, but that it works efficiently in other save-alls as well. When loading materials are present in the waste-waters, the Sveen size solution should be ripened for 24 hours. This is indicated in Fig. 2, where the broken line represents per cent of recovery from waste waters from unloaded paper, and the solid line shows the yield from loaded paper waste waters (both plotted against the time of aging size solutions). The yield in a Sveen-Pedersen save-all with a capacity of 10.5 cubic

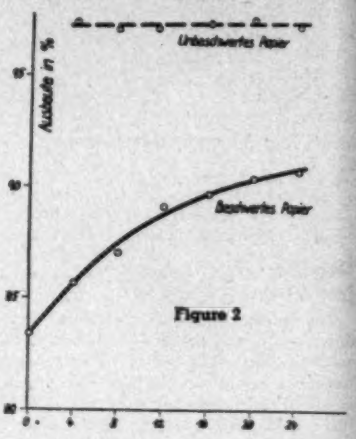


Figure 2

meters, with a flow of 1000 l. per minute of waste water to be clarified gave a pulp recovery of 90.6 to 99.3% (average 95%). When fillers are present the recovery is lowered, and in the case of loaded paper manufacture this lies below that formed in the sedimentation save-alls. The advantages of the Pedersen save-all seem to be:—(1) rapid clarification in a save-all chamber of relatively small capacity with a rapid rate of flow; (2) open construction which aids purification of the chamber and permits the rapid transition from manufacture of one type of paper to another; (3) mechanical devices for rendering the save-all insensitive to fluctuations in the amount and concentration of the waste water; (4) very high thickening capacity, which is of fundamental importance in the total water consumption and operation of the paper machine. Disadvantages, however, appear to be a relatively high power consumption as well as the cost of the chemicals used. The authors have given details (with graphs) of the influence of save-all operation (e.g. (a) the pressure in (W) (b) the rate of pulp removal by (Sch); (c) variations in yields with rate of flow and with the concentration

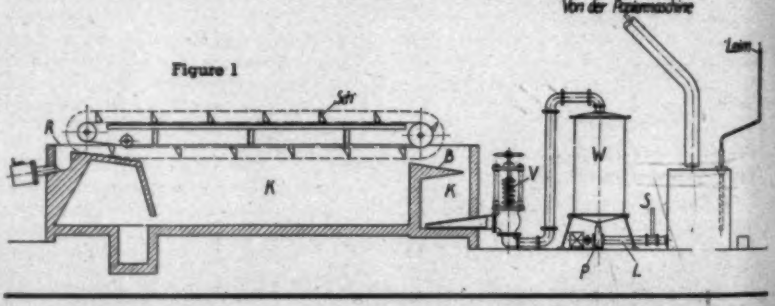


Figure 1

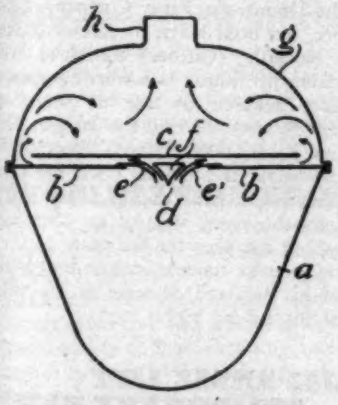
of loading material; (d) stock recovery from waste waters in grams per minute; (e) the thickening action and its significance on the stock and water economy of the entire paper mill operation). W. Brecht and K. Scheufelen. Papier-Fabr. 36 (Tech-Wiss. Tl.) 121-9; 136-40 (1938).

New Method for Determining Cellulose in Wood

By the interaction of acetaldehyde and ethylene glycol in the presence of phosphoric acid (a method devised by Verley), glycol acetal is formed. This compound, boiling at 82-5 deg. C, was found to be a delignifying agent, and could be used in the determination of cellulose much as a dioxane is employed. The reagent was applied to such woods as birch, pine, spruce and alder. N. S. Kozlov, L. E. Olifson and E. Shapiro. Bumazhnaya Prom. 15, No. 5, 33-5 (1937) through C. A. 32, 2341 (1938).

Drying Apparatus for Coated Paper

The patent claims an innovation for the drying of paper webs that have been coated on both sides. The device, as illustrated, consists of a hot air duct (a) above which is the supporting table (b) which carries the paper web (c) and which has a centrally located slot (d) running throughout its entire length. The width of (d) may be regulated through valves (e) and (e'), which means that the positions of these valves actually control the amount of air passing through (d). A distributor (f) triangular in cross section divides this air current so that half of it goes to the right



and the other half to the left of (c), and this forms an air cushion between (c) and (b) and keeps the former at an even level. The air rising above (c) as shown by the arrows, enters the hood (g) which covers the web, and (g) is connected through (h) to a suction fan. German Patent 652238, Kl. 55d, through British Paper Maker and British Trade J. (T. S.) 95, 53 (1938).

New Technique in Fiber Analysis

By the method described by the author, mechanical, unbleached and bleached (sulphite) pulps may be sharply differentiated under the microscope. One tenth g. of the basic dye (see below) is dissolved in a mixture of 25 c.c. methyl glycol, 25 c.c. glycerol, and 25 c.c. of a 4% aniline sulphate solution. The dried pulp mixture is then treated with a drop of the solution, and examined. The contrasts depend on the relative affinities of the basic dyes for the three types of pulp. For example, the aniline sulphate always reacts first with lignin-containing mechanical pulp, giving a yellow, orange or brown color. The unbleached pulp is colored by the dye. The bleached pulp remains colorless. A number of dyestuffs were used, but the following were the most satisfactory: parafuchsine (which colors the unbleached pulp wine-red); crystal violet (which gives a blue coloration to the unbleached pulp), Rhodamine B extra (which gives a red color), methylene blue medium (blue), Gallo Blue E (blue), and Cölestin Blue B (Blue). Of these, the last three dyes named give the sharpest contrasts. Paper samples (pretreated to remove size, etc.) may be tested by means of these reagents. August Noll. Papier-Fabr. 36, (Tech. Wiss Tl.) 133-5 (1938).

Bag Paper Treated with Naphthenic Acid in Cuprammonium

The solution which consists of 203 grams per liter of naphthenic acid per liter, in a cuprammonium solution containing 58 g. CuO, 5.4 g. Fe_2O_3 and 52.7 g. ammonia per liter, had been used previously in the impregnation of fish nets, and was now applied experimentally to bag paper. While the water resistance increased markedly and air permeability decreased, the mechanical properties of the finished product suffered. This was shown in both laboratory and in mill runs. The paper may be pasted with an adhesive made from starch. Belaj. Bumaschnaja Prom. 15, No. 7, 45 (1937), through Papier-Fabr. 36 (Abstracts) 66, (1938).

German Papermaking Materials

This is a condensed address, in which the author reviews some of the more unusual raw materials that may enter paper manufacture. He covers briefly the uses of flax, hemp, nettle, yucca, cornstalks, hops, willow-bark, potato tops (Kartoffel-kraut), wheat straw, broom, reeds, and peat. Max Lüdtke. Papier-Fabr. 36, (Tech.-Wiss. Tl.) 65-8 (1938).

◆

▶▶▶ AN INTERESTING OPINION on the general extent of over purchase by consumers, was recently expressed by Arthur L. Dawe, general manager of the St. Maurice Valley Paper Company. According to Mr. Dawe this is represented by 33-1/3 per cent and will have to be consumed before any re-purchases.

▶▶▶ TURKEY WILL HAVE a third pulp mill, it is reported recently. Work on the new project will commence as soon as the construction work on the mill at Izmit is completed.

TANKS
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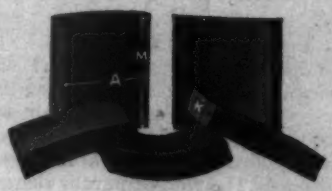
for Acid Storage, Processing and Pulp Bleaching



KNIGHT-WARE brick or tile linings combined with Pyroflex protected steel or concrete shells make the most durable and corrosion proof equipment available for acid work.

PYROFLEX provides a continuous leak-proof lining for steel or concrete tanks or towers. It may be applied in your plant and requires no vulcanizing. It is adaptable without a tile covering for caustic solutions and acids of a non-oxidizing character.

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GOVERNMENTAL

AWP WINS POWER CASE VERDICT

The United States Supreme Court has denied the petition of the Holyoke (Mass.) Water Power Company for a review of the First Circuit Court of Appeals decision dismissing its suit to prevent the American Writing Paper Corporation, also of Holyoke, from making general use of the power generated on the Connecticut River.

The power is generated by the company at some 20 mill sites on the power company's canals in Holyoke, the petition said. The AWP Corporation acquired the sites from the power company. The power company charged it sold the canal mill sites with the express restriction that power generated at individual sites should be used only in a plant at the site. The paper company, it is contended, was violating its restriction by generating power at five sites, running the power into a general transmission system and distributing it to plants at other sites. The power company sought an injunction restraining the AWP from continuing the practice but the Circuit Court of Appeals held the paper company was acting within its legal rights.

As a result of this decision the Holyoke Municipal Gas & Electric Department will start shortly on the development of a hydroelectric unit on the site of the corporation's Holyoke division. The development of the Holyoke mill division powers will greatly enhance the municipal plant's services.

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▶▶▶ THE FEDERAL TRADE COMMISSION at Washington has announced that a complaint has been filed accusing nearly twenty manufacturers of paper and pulp and wooden picnic plates of illegal price fixing.

◆

WALLGREN BILL PASSES HOUSE

Congressional action on the Wallgren bill to create a national park on the Olympic Peninsula of Washington State moved a step nearer on May 16, when the House of Representatives approved the measure in a form providing for a park of 860,000 acres.

This area is slightly smaller than the territory originally proposed in the latest Wallgren bill and much larger than the area suggested by Governor Clarence D. Martin of Washington, who appeared before the committee in a hearing recently. Governor Martin's plan had the backing of a large share of the pulp and lumber industrial organizations interested in the timber supplies of the Olympic Peninsula (cf. *Paper World*, P. 12, May, 1938).

◆

LOWER RATES MAY BENEFIT WIS. MILLS

A reduction of ten to fifteen per cent in the freight rates on Wisconsin shipments to southern areas probably will find Wisconsin paper mills among the chief beneficiaries. The revision was announced late in April by the Wisconsin Public Service Commission, upon notice from the Interstate Commerce Commission. Virtually the entire Wisconsin paper mill section was included in the higher rates ten years ago when all of the State, except the area south of Milwaukee, was subjected to the increased rates. Among the states in the low rate area were Illinois, Indiana, and Ohio.

◆

COURT HEARING IN STOCK SALE CASE

That the price paid for Certain-teed stock by Celotex Corporation was not unfairly arrived at, and not the result of inequitable conduct, was the report filed by Referee Harry C. Kane in his report to Supreme Justice Ferdinand Pecora in New York, after several weeks of hearings. The report stated that while the price paid to Phoenix Securities Corporation was higher than the market quotations, Referee Kane said that the market prices do not represent a true value of the securities purchased, and should not be taken to determine their value. It was shown that the Phoenix representatives on the Celotex board of directors refrained from voting on the purchase of Certain-teed securities from Phoenix.

◆

LAKE SULPHITE CO. SUES FOR DAMAGES

An order permitting the Royal Trust Company, receiver and manager of the Lake Sulphite Pulp Co., Ltd., to institute an action against Charles W. Cox, Ltd., of Port Arthur, Ont., was issued recently. It was explained that the proposed action was for damages alleged to have been caused to the pulp company in respect to certain cutting and lumbering operations of G. W. Cox, Ltd., on the timber limits of the pulp company.

◆

DUTY REFUNDED BY BRITISH HONDURAS

Since February 15 the Government of British Honduras is allowing a refund of any duty paid on newsprint and paper used for the printing of newspapers on application being made by the importer and supported by a statutory declaration by the newspaper firm that the paper has been wholly used in the printing of newspapers. Newsprint is dutiable in British Honduras at 10 per cent ad valorem British preferential tariff (applicable to Canada) and 20 per cent ad valorem general tariff (applicable to all countries outside the British Empire).

◆

CANADIAN COMPANY SUED BY FISHERMAN

Action for $3,341 damages against the Donnacona Paper Company, Quebec, has been taken by Arthur Matte, a Neuville, (Quebec) fisherman, who claims his fishing and other equipment have suffered because of waste allegedly dumped into the Jacques Cartier River. He contends that, under provincial and federal laws, the company is not permitted to dump refuse into the river and he is, therefore, asking damages for the years 1935 to the present time, claiming destruction of his nets and decrease of the value of his fishing rights.

◆

JAPANESE LIFT TEMPORARY BAN ON RAYON PULP

It was recently disclosed that drastic government supervision over imports and exports in the Japanese ports of Yokohama, Osaka and Kobe, had threatened the movement of Canadian rayon pulp to Japan. An executive of the Kokotsai Line, which operates motorships to the ports in question, disclosed this news recently.

The fate of the rayon pulp importation hung in a balance but finally the Japanese Government relaxed its temporary ban and permits were obtained for bringing the pulp into the country.

FORESTRY

CANADA LOSES MILLIONS BY FOREST FIRES

Forest fires in Canada during the last ten years have caused a direct loss of more than $48,000,000, according to a statement issued by the Department of Mines and Resources at Ottawa. Pleading for still greater caution and co-operation on the part of the public, the statement says that the loss mentioned does not tell the whole story as it is impossible to measure in dollars and cents the indirect losses in soil fertility and scenic value and the damage caused by floods, soil erosion and the lowering of water levels in streams, all of which are the inevitable results of extreme denudation.

CANADIAN FORESTRY ASS'N ELECTS NEW PRESIDENT

New president of the British Columbia branch of the Canadian Forestry Association is O. A. Jorgenson, assistant manager of the British Columbia Pulp and Paper Company, who succeeds F. R. Brown, secretary of the B. and K. Logging Company, in his new post.

Reports show that the organization is making vigorous progress in its work of furthering conservation in B. C. Charles Wilkinson, manager, said that forest branch rangers and officials were co-operating fully, especially in the instruction of boys in fire-fighting methods. Rangers also aid with the annual lecture tours which are conducted by cruiser and motor-truck each summer (cf. *Paper World*, P. 40, Oct. 1937).

▶▶▶ MEMBERS OF THE FIELD STAFF of the Vancouver forest district brought a successful three-day convention to a close with a banquet at Hotel Georgia, Vancouver, B. C., recently. The principal speaker was Chief Forester E. C. Manning, who explained the importance of changes in the Forestry Act to the foresters.

REFORESTATION PROGRAM URGED

R. N. Cunningham, director of the federal forest experimental station, for the Lake States at St. Paul, Minn., addressed members of the Wisconsin section of the Society of American Foresters recently and urged the 100 manufacturers, foresters and conservation workers to look into the advisability of manufacturing specialty products that can be made from inferior wood. Mr. Cunningham stated that Wisconsin's position in wood pulp production is being threatened by depleted forests. He advocated a wide range reforestation program and selected logging.

FORESTERS EXPERIMENT WITH FAST-GROWING TREE

The Forest Service of the Federal Government reports a considerable measure of success in its efforts to develop a fast growing tree for the soda pulp industry. Experiments have been conducted at the Northeastern Experiment Station at New Haven, Conn., and one strain developed has already produced trees 7 inches in diameter and 37 feet tall. A hybrid strain under cultivation has been found rust resistant, keeping its leaves while other varieties of the species lost theirs in the early fall. Some 248,000 cuttings from 25 hybrid poplars have been distributed to Federal nurseries in 20 states.

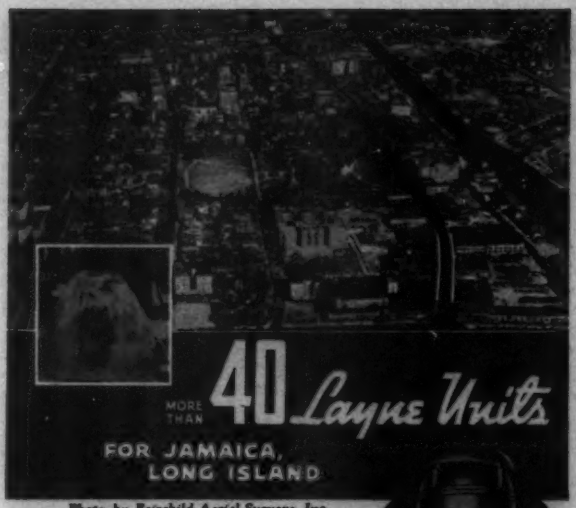

Photo by Fairchild Aerial Surveys, Inc.

With a daily production capacity now in excess of 50,000,000 gallons of water from more than 40 Layne Units, Jamaica, Long Island, has easily, economically, and satisfactorily kept a step ahead of a rapidly growing population. By decentralizing their three original central stations, which quickly would have become inadequate, their Layne Wells and Pumps are now spaced over a forty square mile area. Such an arrangement has assured an ample supply of water at all times, and provided for further expansion as their water demand increases. Since 1920 Layne Wells and Pumps have served the Jamaica Water Supply Company, and the record of low upkeep cost and high efficiency is typical of Layne installations throughout the Nation.

AFFILIATED COMPANIES

Layne-Arkansas Co., Stuttgart, Ark.
Layne-Atlantic Co., Norfolk, Va.
Layne-Central Co., Memphis, Tenn.
Layne-Northern Co., Mishawaka, Ind.
Layne-Louisiana Co., Lake Charles, La.
Layne-New York Co., New York City, and Pittsburgh, Pa.
Layne-Northwest Co., Milwaukee, Wis.
Layne-Ohio Co., Columbus, Ohio.
Layne-Texas Co., Houston and Dallas, Texas.
Layne-Western Co., Kansas City, Mo., Chicago, Ill., Minneapolis, Minn., and Omaha, Nebraska.
Layne-Bowler New England Company, Boston, Massachusetts.
International Water Supply, Ltd., London, Ontario, Canada

An inadequate water supply is a serious flaw with any city or industry. If you have plans for increasing your water supply, let one of our engineers counsel with you. His advice and help will be very valuable. For literature address, LAYNE & BOWLER, Inc., Dept. P, Memphis, Tenn.

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New Catalogues and Publications

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—Two new bulletins have recently been issued by this company. Bulletin No. 1165-A explains the construction and uses of the company's bracket bearing, type A B synchronous motors and Bulletin 1156-A contains a detailed description of the firm's large polyphase induction motors. Both publications are well-illustrated and both contain complete information as to the various features of the motors.

Cyclone Fence Co, Waukegan, Ill.—An interesting brochure has recently been put out by this company. The release deals with the design, construction and uses of the company's chain link conveyor belt drives and presents, through illustrations and written material, an interesting picture of the company's products.

De Laval Steam Turbine Co., Trenton, N. J.—A new catalogue (C), recently issued by this company, describes the company's small steam turbines for driving auxiliary machinery such as generators, pumps, fans, etc. The catalogue, twenty pages in length, is well laid out and offers a clear picture to the reader of the firm's velocity stage turbines. Pictures and cross-sectional illustrations serve to further aid the reader.

Elwell-Parker Electric Co., Cleveland, Ohio—Two recent bulletins issued by this firm describe the company's fork trucks and high lift platform trucks and show typical applications of the basic machine to the various industries by the use of correct attachments.

Fischer and Porter Co., Philadelphia, Pa.—An extremely interesting brochure which has to do with this company's rotameters, has recently been put out by the firm. Covering 24 pages, the release contains much valuable information as to the operating principles, construction and uses of the instruments. It is well illustrated and includes much data on the various features of the product. List prices and dimensional tables are also included.

Foxboro Co., Foxboro, Mass.—A new 8-page bulletin published by this company entitled *Controlled Pneumatic Loading* contains an informative discussion on roll weighting and related applications which require pressure, such as in calendars, or tension, such as for dryer felts. Schematic layouts show how the control system is used with press rolls, calendars and supercalendars. Installation data for all of the basic parts in a dual automatic system are included in the bulletin (No. 217-1), which is punched for loose-leaf filing.

General Refractories Co., Philadelphia, Pa.—An attractive booklet dealing with this company's refractory materials, has recently been published by this concern. The release is printed in two colors and contains charts, tests and general information on three types of super duty refractories manufactured by the company.

Hancock Valve Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.—This company's Bulletin 5-7000 describes in a graphic manner the redesigned line of forged and cast steel valves manufactured by the firm. Photographs diagrams and specification tables aid the written material in giving the reader a complete description of the products.

Homestead Valve Manufacturing Co., Coraopolis, Pa.—A very attractive 48-page valve reference book (No. 38) has just been published by this company. The book features a more complete line of boiler blow-off valves; several new lines of lift-plug valves and contains more complete dimensions, tables, and facts about the company's valves. In addition there are three full pages of suggested uses for valves in all industries. Cross-sectional diagrams and photographs are featured throughout.

Ingersoll-Rand Co., Phillipsburg, N. J.—A new bulletin, recently issued by this company, deals with the company's end suction centrifugal pump, style CRV, built in capacities up to 1,000 gallons per minute for heads up to 500 feet. Pictures of several installations of the pump, as well as complete tables of performances and dimensions, are contained in the 15-page release.

Lawrence Machine and Pump Corp., Lawrence, Mass.—A new bulletin (No. 201-2) which explains the construction and uses of the company's double-suction, horizontally-split pump, has been released lately by this concern. The buletin includes dimension tables and specifications, in addition to diagrams showing the actual construction of the pump.

Leeds & Northrup Co., Philadelphia, Pa.—A new catalog (E-96-1) issued by this firm describes an entirely new potentiometer manufactured by this company, for the measurement of pH with self-contained glass electrodes. The bulletin describes the instrument fully by means of well-written literature and photographs. Price lists are included.

Link-Belt Co., Chicago, Ill.—A splendid new data book (No. 1757) has just been issued by this company. The book, 174 pages in length and bound in an attractive green cover, contains complete information about the design, construction, uses and adaptations of the company's roller chains. Not only does this book contain a wealth of data as to the dimensions, drive ratios, etc., of the product, but in addition there are many installation views included. Special attachments for the chains are illustrated and explained and price lists are included. There are many cross-sectional diagrams, charts and tables which, together with the written material, serve to present to the reader a detailed and complete picture of the company's product.

McCollum Hoist and Mfg. Co., Downers Grove, Ill.—A new bulletin (HH2) which describes the ball bearing spur geared chain hoists manufactured by this company has been released lately. The various types of hoists are illustrated and specification tables and price lists are included.

Norma-Hoffmann Bearings Corp., Stamford, Conn.—This company has just put out a new bulletin (No. 962) concerned with the company's precision needle roller bearings and needle rollers. The bulletin gives complete data as to sizes, dimensions and load ratings of complete bearings.

Truscon Laboratories, Detroit, Mich.—Brick and concrete preservation is the theme of this new bulletin recently issued by this firm. The book describes the process developed by this organization for the protection of brick, stone or concrete. The book is printed in two colors and is replete with photographs illustrating the application of the preservative.

Willson Products, Inc., Reading, Pa.—A new catalogue of safety devices has just been issued by this company. The catalogue, 34 pages in length, contains many illustrations of various helmets, respirators, goggles, gloves, masks, and other industrial safety devices, in addition to descriptive written material. Price lists are included in this release.

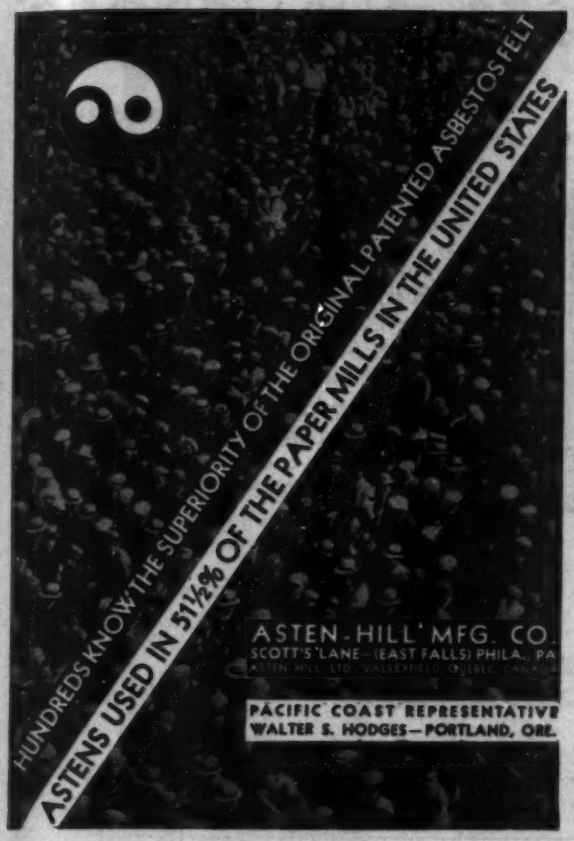
Zenith Electric Co., Inc., Chicago, Ill.—This concern has recently put out a new bulletin regarding the automatic control equipment manufactured by the company. Included in the release are illustrations of and descriptive written material on remote control switches, automatic time switches, automatic reset timers, magnetic contactors, interval timers, process timers and program clocks.

BOOKS

The Manufacture of Paper Containers—This book, written by P. E. Verstone, was published originally in 1922. A second edition, the present issue, was brought out ten years later. Therefore, it is being announced not as a new work, but as a volume that should be better known to the industry, particularly, by those individuals interested in manufacture of paper containers in one form or another. It is a book of approximately 300 pages, that discusses the raw material of paper containers, machine-made boxes, the upright covered box, the folding box or carton, the upright wire stitched box, the collapsible wire stitched or taped box, the round box, the hand-made box, the paper bag, and auxiliary materials. It also includes some tabular material and a glossary and index of most of the terms used in the book. Where a British term is different from that used in the United States, the United States equivalent also is given. Its publisher, Verstone & Company, 29 Ludgate Hill, London, E. C. 4, England, has priced the book at 15 s. 6 d. net.

Graphic Routes to Greater Profits—Into this book of 450 illustrations and of more than 300 pages, John W. Esterline, the author, has brought together experiences of some three hundred engineers in the solution of industrial problems. The problems, as indicated by the various chapters, relate to the generation, transmission and distribution, sale, purchase and use of power; to the design and selection, operation, maintenance, and safety of machines; to the development and improvement, and inspection and control of processes; to measuring of productive work, scheduling performance, and determining costs; and to inspection and testing, demonstration and sale, and research and special problems. Sixteen direct citations are made to paper mill problems; and numerous other references, pertinent to the industry, are included. The volume is printed on heavy enameled stock, the page size being 8½ by 11 inches, and is bound attractively in tooled, brown Fabricoid. It is priced at $3.00 a copy. The publisher is The Esterline-Angus Company, Indianapolis, Indiana.

Trees of Northeastern United States—This book is a revised and enlarged edition of *Trees of New York State, Native and Naturalized*. Its author is Dr. H. P. Brown, Head of the Department of Wood Technology, New York State College of Forestry. Dr. Brown also was author of the original volume which proved so popular that it has been out of print several years. The new edition is a volume of nearly 500 pages. It is attractively bound in red cloth cover with title overprinted in gold. The introductory pages are devoted to information pertaining to the principles involved in naming, classifying, and identifying trees. These pages are followed by master keys which permit identification of species, through leaf, fruit, and twig characteristics. The next section of the book, which includes the major portion of text, describes 152 kinds of trees. One page of descriptive material is devoted to each species. There also is a full page plate of drawings to illustrate each of them. The plate and the descriptive material for each species are on facing pages. The final pages of the book are devoted to a key to genera and species, to an explanation of the derivation of the names of trees, to a glossary of derivations, to a glossary of scientific terms used in the text, and to a general index. The book, published by The Christopher Publishing House, 1140 Columbus Avenue, Boston, Massachusetts, is priced at $3.00 a copy.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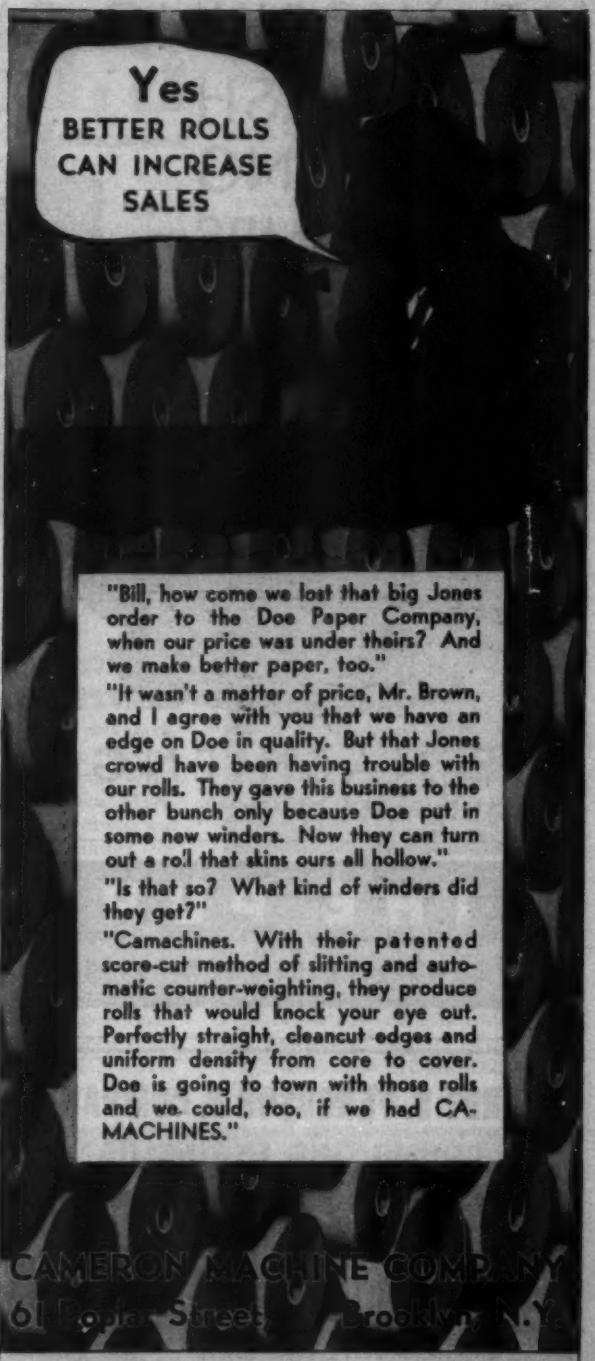
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"It wasn't a matter of price, Mr. Brown, and I agree with you that we have an edge on Doe in quality. But that Jones crowd have been having trouble with our rolls. They gave this business to the other bunch only because Doe put in some new winders. Now they can turn out a roll that skins ours all hollow."
"Is that so? What kind of winders did they get?"
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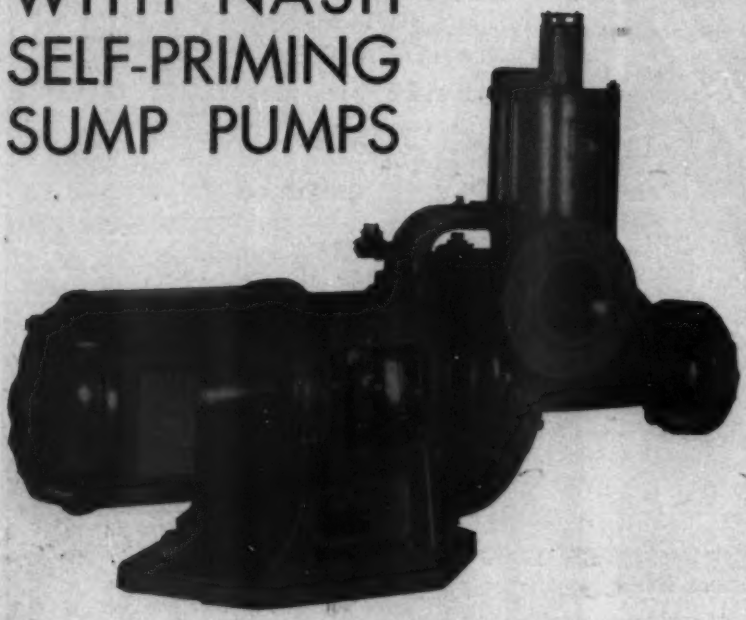

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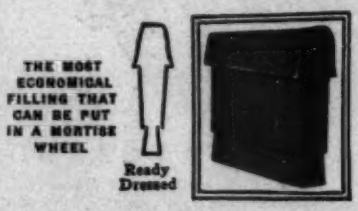
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PERSONALS

"CHIEF HAWKEYE" CULLEN HONORED

President R. J. Cullen of the International Paper Company was honored by a banquet and dance at the Hotel Pennsylvania recently. Eight hundred guests were present at the function which was tendered Mr. Cullen by the employees of the company.

The festivities were enlivened by an Indian ceremony with Toastmaster

R. J. Cullen

Joseph L. Fearing, vice-president of the company, serving as Chief Firing Water. Mr. Fearing's own version of Hiawatha told the story of the International Paper Company, naming old time officials of the company and concluding with a fine tribute to the guest of honor, "Chief Hawkeye Cullen." The affair was held under the auspices of International's Quarter Century Society, of which Mr. Fearing is president.

◆

CIVIC LEADERS HONOR W. F. ASHE

A banquet in honor of W. F. Ashe, personnel director of the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin, was held on May 4 in Kaukauna, with over 100 civic leaders and company representatives present. The occasion for the affair was the departure of Mr. Ashe from Kaukauna and the Thilmany company, to take over his new duties as director of the new Wisconsin Department of Commerce (cf. *Paper World*, p. 48, May 1938). At the banquet Mr. Ashe was feted by Mayor Lewis F. Nelson of Kaukauna and was presented with a gift on behalf of his former associates by A. M. Schmalz of the Thilmany company. Mr. Ashe had been personnel director at Thilmany for 14 years.

Mr. Ashe expressed his appreciation and explained the functions of the new state department which, he said will not be to regulate business. Co-operation is to be the keynote of the department, Mr. Ashe stated. Efforts will be made to build up industries in Wisconsin, give business a voice in legislative matters and reduce unemployment.

◆

SUPERINTENDENT DAVIDSON RETIRES

After fifty-five years of papermaking, Charles Davidson, Sr., superintendent of the No. 2 mill of the Whiting Paper Company, Holyoke, Mass., retired on April 30. The occasion was marked by a testimonial dinner for Mr. Davidson at which 70 employees feted him. Among the guests were Wiliam Whiting, president of the company and Sidney E. Whiting, purchasing agent of the company.

Mr. Davidson, who has been associated with the Kimberly Clark Company and the Strathmore Paper Company, began his papermaking career in Aberdeen, Scotland, under A. Pirie and Sons. When 25 years old he went to India where he was connected with the paper field for nine years. In 1901, Mr. Davidson came to America. He has been with the Whiting company since 1928. Mr. Davidson is succeeded as superintendent of No. 2 mill by Fred E. Neumann. The retiring superintendent's son, Charles Davidson, Jr., will have supervision of both No. 2 and 3 plants.

◆

HERMAN OTTO MADE SUPERINTENDENT

Associated with the American Tissue Mills, of Holyoke, Mass., since 1919, Herman A. Otto has been

H. A. Otto

named superintendent of the Stony Brook and Pearl City divisions of the company. He succeeds John McEwan who is now with the Mohawk Valley Paper Company of Little Falls, N. Y. (cf. *Paper World*, p. 55, Dec., 1937).

Mr. Otto has been assistant to Mr. McEwan since 1920. He joined the

Fred E. Neumann (left), new superintendent of No. 2 Mill of Whiting Paper Co., Holyoke, Mass., accepts farewell and good wishes from his predecessor, Charles Davidson, Sr., a papermaker for 55 years, who retired as superintendent a few weeks ago.

company as a cost accountant in 1919 and was transferred to the Stony Brook division the following year. He was formerly connected with the Gilbert and Barker Company of Springfield, Mass.

◆

SUGGESTIONS PROFITABLE TO MILL EMPLOYEE

For submitting the greatest number of helpful suggestions to the Crown Willamette Paper Company, Camas, Wash., C. M. Howell, edgerman in the company's wood mill, was recently tendered the grand cash award of $60 by the mill officials, who periodically give such awards for suggestions to improve mill operation and reduce hazards.

Mr. Howell, a graduate of the company's four-year course on pulp and

C. M. Howell

paper-making, has submitted over 100 suggestions since 1932 and has collected on 39. While taking the instruction course at Crown Willamette, Mr. Howell won first prize in an essay contest conducted by G. W. Charters, assistant manager of the Camas plant and was commended by the late G. P. Berkey, vice-president of the company. The subject of the essay was "On The Job." Mr. Howell's latest suggestion to the company was to install a saw at the wood mill to clean up and salvage wood by cutting out knots, rotten spots, etc.

◆

W. S. STUHR PRES. UNITED PAPERBOARD

William S. Stuhr, formerly vice-president of the United Paperboard

Newly elected officers of United Paperboard Co. Left to right—Wm. S. Stuhr, president; James Todd, Jr., first vice president; E. G. Plum, second vice president.

Company, New York, has been elected to the presidency of the company, succeeding the late Sidney Mitchell (cf. *Paper World*, p. 55, April 1938). New first vice-president of the company is James Todd, Jr. E. Gaddis Plum is now second vice-president.

One hundred dollars in cash was left by Mr. Mitchell to every employee of the United Paperboard Company who had been with the company five years. Many of the employees were remembered with larger bequests.

◆

JOHNSON LEAVES SHERMAN CO. FOR CROCKER-McELWAIN

For the past eleven years superintendent of the Sherman Paper Company in Watertown, N. Y., Frank A. Johnson has been named general superintendent of the Crocker-McElwain Company of Holyoke, Mass.

Prior to being with the Sherman Paper Company, Mr. Johnson served as assistant general superintendent and

Frank A. Johnson

later general superintendent with the King Paper Company of Kalamazoo, Mich. He learned papermaking in Holyoke, having worked in the old Norman division of the American Writing Paper Corporation about 25 years ago.

◆

H. LEE RAUCH PRESIDENT OF CONSOLIDATED

Succeeding his father, the late Edward C. Rauch (cf. *Paper World*, p. 55, May, 1938), H. Lee Rauch was elected president and manager of the Consolidated Paper Company, Monroe, Michigan, at a special meeting of the

H. Lee Rauch

board of directors on April 25. Mr. Rauch had been vice-president and general manager since the formation of the present Consolidated in 1921. His father had been president since the 1902 reorganization with C. A. Boehme.

Stanley J. Newcomer was named to the board and was elected one of the

five vice-presidents. George L. Bornson was also named to the board. Both men are sons of men who were early connected with the company. They will fill the two vacancies caused by the death of Mr. Rauch and the recent resignation of Charles Hass, who is to head his own strawboard company in Newark, Ohio.

◆

BRADNER APPOINTED BY RESEARCH INST.

Lately appointed a member of the newly formed Industrial Research Institute is Donald Bradner, director of research and development of the Champion Paper and Fibre Company, Hamilton, Ohio. The Institute, a national organization composed of scientific research executives of industrial corporations, has been established as a result of a factual survey which indicated a need for an organization of industrial research executives so that they might have an opportunity to discuss common problems relating to laboratory organization and administration.

◆

▶▶▶ *Commodore and Mrs. Royal S. Kellogg* sailed from New York City on April 29 for an extended trip abroad. While the Commodore visits the papermaking regions of Great Britain and the Continent, Mrs. Kellogg will devote her time to painting some of the beauty spots located on the isle. It is expected that the Kelloggs will be away for three months.

◆

▶▶▶ Formerly associated with the General Chemical Company at its Marcus Hook (Penn.) plant, *Vincent Curll* recently resigned his position to become a member of the technical sales division of the Pennsylvania Salt Manufacturing Company. Mr. Curll will do research work on various acid-proof cement problems as well as technical sales work. He is a graduate of Williams College, Williamstown, Mass.

Vincent Curll

◆

▶▶▶ New superintendent of the sulphite mill of the Crown Willamette Paper Company, Camas, Wash., is *A. D. Wood*, formerly superintendent of the Shaffer Pulp Company, Tacoma, Wash. Mr. Wood succeeds Glenn Long, who has been transferred to the technical control department. J. G. Savage, shift foreman of the Grays Harbor Pulp and Paper Company, has been named Mr. Wood's assistant.

◆

▶▶▶ *Harold C. Leighton*, formerly with the Cities Service Refining Company, Braintree, Mass., has been appointed chemical engineer of the Beckett Paper Company, Hamilton, Ohio, according to an announcement by company officials. Mr. Leighton is a graduate of the the Massachusetts Institute of Technology.

A
Million Dollar
PENCIL
No, it's not encrusted with rubies. Nor is it made of platinum. Just an ordinary pencil—but placed in the hands of YALE engineers, it has saved industry millions of dollars yearly.
Always first, YALE engineers originate what others copy. From their fertile brains come the advances that make YALE Hand Lift Trucks the world's most efficient units of their type.
Smooth . . . Safe . . . Simple . . . They're the easiest operating hand lift trucks known. On single stroke models, just one, lone, downward stroke—and the load is up, held securely in place by a special safety hook. On multi-stroke models, gear reduction of ample size brings the heaviest loads into the sphere of easy one-man lifting.
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MRS. BATES HAS 60-YR. RECORD

At 5 o'clock P. M. on April 30, Mrs. Rose D. Bates punched her time clock in the sorting department of the Parsons Division, American Writing Paper Corporation, Holyoke, Mass., and by this action terminated 60 years of service in paper mills, 50 of which were spent in the mills of Holyoke.

Mrs. Bates started work at the age of 14 at the former Salmon Falls Mills, now the Strathmore Paper Company of Woronoco, Mass., for 75 cents per day. She worked 60 hours a week. She remained in this company's employ for a few years, going later to the old Springdale mill in Westfield. Some 50 years ago Mrs. Bates went to Holyoke and began working at the Whiting Paper Company. After five years there she became employed at the American Writing Paper Corporation and in the 45 years of steady work she had not missed a day, that anyone can remember, because of illness.

Mrs. Bates' retirement was marked by the presentation of a cameo brooch by the sorting department. James T. Johnston, foreman, made the presentation to Mrs. Bates and remarked: "I am sorry this moment has come . . . I am losing a good sorter."

◆

Foreman James T. Johnston, of the Parsons Div., American Writing Paper Corporation, presents gift to Mrs. Rose E. Bates, of Aldenville, Mass., when she retired after 60 years of service in paper mills.

J. N. CHAPPLE LINCOLN'S NEW AUSTRALIAN MGR.

New managing director of the Lincoln Electric Company's recently established plant in Sydney, Australia, is J. N. Chapple, formerly associated with the American Rolling Mill Company of Middletown, Ohio. Mr. Chapple's appointment has been announced by the Lincoln company.

Although a newcomer to the Lincoln organization, Mr. Chapple is a veteran in the welding industry, particularly abroad. As a welding development engineer he installed equipment and developed the sales organization of the Armco International-Lincoln Electric arc welding electrode factory in Buenos Aires, Argentina. His experience in this work fits him remarkably well for the organizational and development phases of his new position at the Lincoln subsidiary. Mr. Chapple will be in charge of manufacturing, sales and advertising of the new firm.

◆

▶▶▶ Formerly general manager of St. Lawrence Paper Mills, *D. G. Stenstrom* left recently for Australia where he will assume new duties. It is understood that Mr. Stenstrom has undertaken an important mission on behalf of the industry.

◆

J. N. Chapple

KIMBALL-PEASE NOW ASSOCIATED WITH H. & W.

Two new members have been added to the executive staff of the Hollingsworth and Whitney Company.

The services of B. Milton Kimball, who has been general manager for the Gilman Paper Company, Gilman, Vermont, and Roger Q. Pease, sales manager of the same company, have been secured by H. & W. as a result of the new Belgrade Kraft Division recently established (see Trade Winds). Mr. Kimball and Mr. Pease will manage this new division, with the former in charge of production. Mr. Pease will make his headquarters at the company's New York Office at 230 Park Avenue while Mr. Kimball will be located at Waterville, Maine, site of the Hollingsworth and Whitney Company mills.

It has been announced that C. J. Faulkner has been appointed manager of manufacturing at the Gilman Paper Company, replacing Mr. Kimball who resigned recently to take over his new post with H. & W.

◆

▶▶▶ Newly appointed director of public relations for the Container Corporation of America is *Albin P. Dearing*, who was formerly connected with N. W. Ayer & Son, Inc., as publicity director. Mr. Dearing has also served as promotional manager for the Ford Motor Company's Florida Exposition of 1936, and prior to that was director of publicity for the State of Florida and the Government of Puerto Rico.

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DR. CRAIN WITH NEKOOSA-EDWARDS

New assistant technical director of the Nekoosa-Edwards Paper Company, of Port Edwards and Nekoosa, Wisconsin, is Dr. Richard C. Crain, a graduate of the Institute of Paper Chemistry at Appleton, Wis., and formerly connected with the Whiting-Plover Paper Company of Stevens Point, Wis. He will be under Dr. T. A. Pascoe. Dr. Crain received his B.A. degree at Wooster College in 1930, an M.S. degree in 1931 and his doctor's degree in 1934 from the Institute. Previous to his employment at the Whiting-Plover firm, Dr. Crain received experience with the Gilbert Paper Company, Menasha, Wisconsin.

◆

SORG MAKES CHANGES IN PERSONNEL

Certain changes were recently made effective in the executive management and personnel of the Sorg Paper Company, Middletown, Ohio, following a special meeting of the board of directors.

Donald G. Driscoll was elected to the newly created office of executive vice-president, relinquishing his former duties as secretary and assistant to the president; H. C. Johnson, formerly treasurer, was elected to the office of vice-president in charge of sales; John A. Aull, Jr., was elected secretary and treasurer; C. B. Stiles was elected assistant to the president and was also elected to fill the vacancy in the board of directors caused by the death of L. C. Anderson. In addition, L. H. Ritz was elected to the newly formed office of controller of the company.

Officers of the company re-elected by the board of directors in the annual meeting are: J. A. Aull, president; M. T. Hartley and A. F. Smith, vice-presidents; C. E. Aull, assistant secretary, and A. J. Kerschbaum, assistant treasurer.

◆

▶▶▶ At a meeting of the board of directors of the Norma-Hoffmann Bearings Corporation, Stamford, Conn., *Walter M. Nones* was re-elected president of the company and *Odbert P. Wilson* was elected vice-president and treasurer.

◆

▶▶▶ *E. C. Lathrop*, director of technical control of the Crown Zellerbach Corporation, with headquarters in the laboratory at the Crown Willamette Paper Company mill in Camas, Wash., resigned effective May 31 to accept the vice presidency of the Celotex Company of Chicago, with whom he was associated until five years ago.

◆

▶▶▶ THIRTY PULPWOOD AND TIMBER COMPANIES were represented at a recent meeting of the Lumberman's Safety Association held in Port Arthur, Ontario. It was reported at the meeting that the infirmary hospitals established by three operators in camps last year as an experiment, reduced the cost of accidents fifty per cent.

L. L. Brown Paper Co. recently elected A. Millard Daniels (left) president, and Rupert B. Daniels (right), treasurer.

PULP
BLEACHING
COMPANY

ORANGE
NEW JERSEY

CELLULOSE
PURIFICATION

HARWOOD HONORED AT Y.M.C.A. BANQUET

A. J. Harwood, president of the Appleton Woolen Mills, Appleton, Wisconsin, was honored recently at a banquet celebrating the fiftieth anniversary of the Appleton Y. M. C. A. Mr. Harwood who was feted for his long years of service, retired a few years ago after having served as president of the association and the company. The Appleton Y. M. C. A. was organized in 1888.

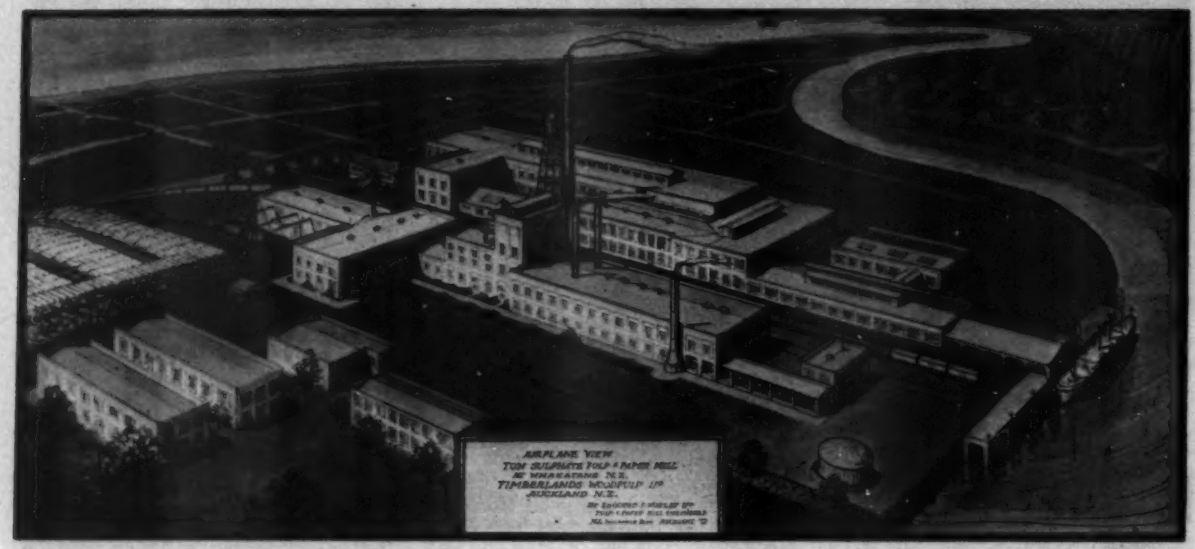
◆

▶▶▶ *E. H. Nunn*, technical director of the Western Waxed Paper Company, a Crown Zellerbach subsidiary, has been transferred from the Crown Willamette Paper Company's Camas mill to the company's offices in Oakland, California.

◆

▶▶▶ FIFTY THOUSAND CORDS of pulpwood were said to have been stranded in the bush of the Hearst and Kapuskasing areas of Ontario due to an unexpected early break-up ruining winter roads through the woods. It is reported that one pulpwood jobber in the district has 12,000 cords of wood left behind in the woods.

OTHER COUNTRIES



Aerial view of new Whakatane paper mill. Operations in this plant, the first in New Zealand, are expected to start about July 1, this year.

NEW WHAKATANE MILL READY FOR PRODUCTION

THE new Whakatane Paper Mills, Ltd., mill at Whakatane, New Zealand, will start production of a varied line of high grade bleach-lined paper boards about July 1, according to present indications. The mill, which cost about $2,000,000 will have a capacity of around 50,000 pounds per day.

Organized in Sidney, Australia, about 10 years ago, the Whakatane firm's first objective was the production of pulpwood in artificial forests, there being no pulpwood supply in New Zealand. The *Pinus Insignis* species of conifers were found to grow very fast in New Zealand, where there is an annual average rainfall of about 60 inches. Experiments in the Forest Products Laboratory in Madison, Wisconsin, proved the wood to be good for papermaking, being similar to jackpine.

The Whakatane company now has about 65,000 acres planted within 25 miles of its new plant and there is a connecting private railroad. The New Zealand Perpetual Forests, Ltd., has a plantation of 130,000 acres and has planted a considerable number of trees but as yet has not decided upon the building of a paper mill.

H. A. Horocks of Auckland, New Zealand, is president of the company which is capitalized at $8,000,000. The consulting engineer for the new project was L. A. DeGuere of Wisconsin Rapids, Wisconsin, who has supervised the building of many mills throughout the United States and Canada. Mr. DeGuere made four trips to New Zealand while construction of the mill was getting under way and spent five months in Europe during 1936 assisting in the purchase of equipment for it.

◆

GERMANS TO MAKE ARTIFICIAL FIBER

The manufacture of artificial fiber from straw is the object of a new venture under the name of Kurmarkische Zellwolle und Cellulose A. G., according to the German *Papier Fabrikant*. The capacity of the works will be some 20,000 tons of pulp. In addition it is being rumored that a new straw cellulose plant will be built near Bremen.

◆

CHILEANS MAY BUILD PULP AND PAPER MILL

The establishment of a pulp and paper mill at Valdivia, Chili, may be undertaken shortly by several prominent business men of that locality. The parties interested propose an initial capital of 13,000,000 paper pesos (one peso equals $0.036). They contemplate using raw material soft woods stated to be found in commercial quantities in the zone adjacent to Validivia and it is stated that the machinery and other equipment not available in Chili will be imported from Germany, Norway and Sweden.

It is interesting to note the rapid progress made in the production of paper and paper products in Chili during the past few years. Prior to 1931, over 70 per cent of paper requirements were imported but at present there are thirteen mills which produce newsprint, writing, wrapping papers, cardboard, pasteboard, wall, toilet and carbon paper.

◆

PAPER FROM NUTS?

The production of a brown pulp from coconut husks is the claim of a Madras (India) scientist who recently declared that the 10,000,000 acres of coconut plantations in India and Ceylon could supply the world with a cheaper and better paper. According to his plan, husk worth 2 rupees ($0.74) would produce paper worth 24 rupees ($8.88). He has requested assistance from the Coconut Board to complete his researches and it is reported he may be asked to explain his process before a joint meeting of the Coconut Board and the Coconut Research Board. It is claimed that the brown pulp could be easily bleached.

ENGLISH NEWS

Trade Position

The British Paper Trade is, in general, passing through a bad period, according to reports. Due to the fact that many mills are cutting down time while others are closing for periods of a week or longer, it has become extremely difficult to maintain prices at their present level. The majority of the British mills are tenaciously adhering to their agreements, however, for it is realized that in the long run nothing is to be gained by cutting prices.

Some cheery notes are to be found, however. Wiggins, Teape and Company, the strongest group of mills in Great Britain making the higher grade paper, has been showing steady progress over several years. During last year their profits reached £522,723 which was £68,633 higher than the previous year. This mill's progress seems to refute the idea that the consumer is always looking for the cheaper article and supports the theory that there is always a ready market for high quality goods. The Star Paper Mills, of Blackburn, reported a profit of £37,784 last year which compares against a loss of £23,719 the year before. John Dickinson and Company, Ltd., raised profits by £92,000 to a total of £369,290 while Albert E. Mallandaine, coated paper makers, showed a trading profit for 1937 of over £34,000.

However, the movement of restricting the output of paper is spreading to all sections of the trade and it is felt that the summer quietness will probably aggravate the situation. Every possible effort is being made to avoid a reduction in present prices for if this operates there will be some heavy losses by the British mills this year.

At the moment of this writing there appears to be signs of a changing atmosphere in Great Britain's paper circles. Home stock trade is slightly improved, as is the export trade. It is felt that too much has been made of the supposed slump and that only a distorted view of the present situation has been accepted.

Heavy fall in demand is proving a serious concern to European paper makers and even extended efforts to restrict output is not having the desired effect. Greaseproof papers are now subject to a 50 per cent restriction, previous restrictions of ten, twenty and thirty-five per cent having proved insufficient. Sulphite papers have declined to 75 per cent output while kraft has been lowered to 35 per cent output.

Sir Stephen Killik

Chairman of Cropper and Company, Calthorp Board and Paper Mills and Containers, Ltd., Sir Stephen Killik, passed away recently at the age of 77. Sir Stephen was formerly Lord Mayor of London, a prominent person in London's civic life and a recipient of many honors.

Price Agreements

Price agreements within the British paper trade are being severely tested at the moment. Before the increased trading of last year agreements existed among the featherweight, M. G. poster and wood free sections and these agreements have now been extended to cover the coated and esparto papers. While trade was expanding and mills booked up for several weeks ahead, no difficulty was found in supporting these agreements but now that trade has fallen off a few of the mills are keeping outside the agreements and hence proving a thorn in the side of the others.

At the moment it would seem as if the conforming and non-conforming groups had reached a stalemate. The mills keeping the agreement seem to be no worse off than the mills without the agreement and vice-versa. It would seem that only two factors stand against a complete breakup of the price agreements. These are: (1) that trade will improve within a short time and (2) that it will be realized that if prices are continually reduced, everyone will be worse off.

Price Decline

Prices on greaseproof and M. G. sulphite paper grades have been reduced by £3 per ton by the two Continental Conventions covering these grades. This shock to merchants and consumers will, it is said, tend to make the British purchaser place more reliance on the home mills from whom relatively small purchases can be made when necessity dictates. Some appreciation of the general decline in current quoted prices can be felt by the recent figures shown below:

ITALIAN NOTES

Use Hemp Wastes For Cellulose

A process for the extraction of alpha cellulose from hemp wastes, of the type not employed for cordage or spinning, is now in effect at the Tresigallo works of the Italian "National Corporations Federation." It is reported that the cellulose from hemp wastes has resulted in the production of some types of paper, although for the most part its use is restricted to the production of medical wadding, nitro-cellulose for explosives, etc. This process, however, will probably reduce Italy's importations of alpha cellulose.

Cellulose Plants

Several new plants for the production of cellulose have been established in Italy.

The firm, "Vita Mayer," of Milan, is, at present, installing in Cairate, a plant for the production of some 4,500 tons of bleached and unbleached cellulose per year; Cartiera di Ceprano e di Atina, Visocchi e Arata, S. A., Naples, is also installing a plant for the production of bleached and unbleached cellulose; Soc. An. Industria Cima, Lecco, will erect a plant for the production of bleached and unbleached cellulose, half rag-stuff and mechanical pulp, to serve its own needs. The production capacity of these plants will total 1,000 tons of cellulose, 3,000 tons of rag half-stuff and 1,250 tons of mechanical wood pulp.

In addition it is learned that Cartiere Ambrogio Binda, Milan, will build a plant for producing fine mechanical wood pulp and that Cartiera di Ceprano Orazio Arata, S. A., and Guglielmo Visocchi, Naples, will install a plant for the production of half-stuff with rags.

▶▶▶ A RECENT DECREE has stated that the limited firm of Cartier di Verona of Milan, and the Industrie Venete della Carat e Cartone Silvio Marsoni e C are now combined.

	April—1937				April—1938			
Sulphite, bleached sup. makes	£20 0s. 0d.	—	£22 0s. 0d.		£16 0s. 0d.	—	£18 0s. 0d.	
" " prime qual.	17 10 0	—	18 10 0		11 10 0	—	12 10 0	
" easy bleaching	15 10 0	—	16 0 0		10 0 0	—	11 0 0	
" strong	14 10 0	—	15 0 0		9 0 0	—	10 10 0	
" news quality	14 0 0	—	14 10 0		8 10 0	—	9 0 0	
Sulphate, easy bleaching, 1st	13 10 0	—	14 0 0		10 10 0	—	11 0 0	
Kraft	13 10 0	—	14 0 0		8 0 0	—	8 10 0	
Kraft (forward)	10 10 0	—	11 0 0		8 0 0	—	8 10 0	
Mechanical Wood Pulp (50% moist)	3 5 0	—	3 10 0		2 7 6	—	2 10 0	

THE DRAPER FELT

Unexcelled for strength, openness, resiliency, and general running qualities. Made to meet the most exacting conditions on all types of machines and all kinds of papers. Only one grade and that the highest.

Made by

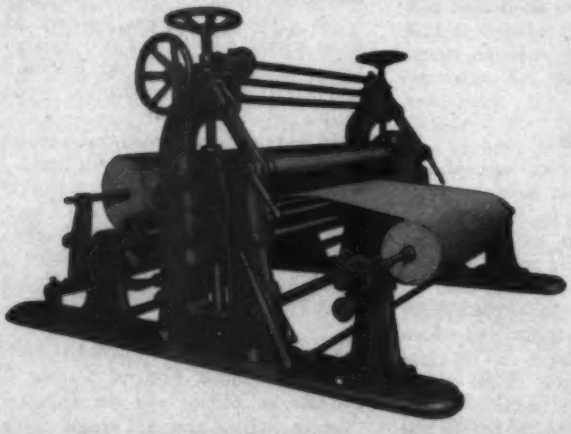
DRAPER BROTHERS COMPANY

CANTON, MASS.

Woolen Manufacturers Since 1856

REPRESENTATIVES

L. H. BREYFOGLE, Kalamazoo, Mich. **C. K. BEECHER, Delaware, Ohio**



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For tissues, cardboards, covers, offset papers, liner boards and other materials taken off jumbo rolls and delivered to rewinder.

Unit illustrated has single drum winder but same unit may be furnished with double drum or friction shaft winder.

Hudson Sharp embossers may be obtained in varied designs for any purpose. Hudson Sharp steel embossing rolls and paper rolls are especially designed for any embossing purpose.

HUDSON SHARP MACHINE COMPANY
Green Bay, Wisconsin

TRIMBEY MACHINE WORKS

GLENS FALLS, N. Y.

Knotters — Pulp Screens — Float Valves — Consistency Regulators —Weight Regulators—Color and Alum Meters—Metering Systems

WANTED—Finishing foreman, experienced in large book paper mill. Apply giving age, education, experience, salary. Also enclose small photo if convenient. Address Box 271, THE FRITZ PUBLICATIONS.

EXPERIENCED REPRESENTATIVE calling on all Pacific coast pulp and paper mills is open for additional lines. Equipment and supplies. Address Box 272, THE FRITZ PUBLICATIONS.

High Density BEATERS

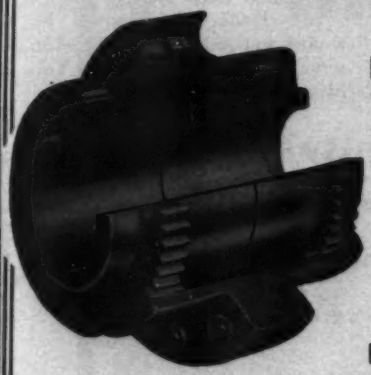
Hundreds of highly successful installations in service.

A WORLD OF DIFFERENCE

THE MIDWEST-FULTON MACHINE COMPANY
DAYTON, OHIO, U. S. A.

POOLE

FLEXIBLE COUPLINGS



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Forged Steel
No Welded Parts

•

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Dust Proof
Fully Lubricated

Send for a copy of our
Flexible Coupling Handbook

•

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BALTIMORE, MD.

CLEANING
Fourdrinier wires
SAFELY

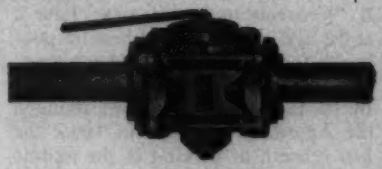
WIRE cleaning with Oakite materials is speedy and thorough. But that's only half the story! For when you know the SAFETY of Oakite cleaning . . . when you discover how the life of wire is prolonged and safeguarded by harmless Oakite action . . . then you'll understand why so many mills insist on doing this important job the Oakite way.

Oakite cleaning can help you lower wire replacement costs. It can help you save time and money, too. Write for full information. No obligation.

Manufactured only by
OAKITE PRODUCTS, INC., 16 Thames St., NEW YORK
Branch Offices and Representatives in All Principal Cities of the U. S.

OAKITE *certified* CLEANING

Duriron Free-Flowing Y Valve



Duriron Quick Releasing "P. R." Valve

Easy Operating
Long Lasting
ACID VALVES

For handling any kind of corrosive solution you will find greatest satisfaction in a valve of The Duriron Company manufacture. All types are made in Duriron or Durichlor (high silicon irons) and in Durimet and Durco Stainless Steels of low carbon content.

The Y Valve is full-opening, positive closing. Machined to close tolerances to assure positive alignment. Guided stem—perfect seating. 1" to 6" stock sizes.

The "P. R." Valve has a floating plunger beneath the plug—quick releasing. Valve body is held under compression—free of strain. 1" to 4" sizes.

Duriron-Nordstrom Valve combines acid resistance with internal lubricating features. Especially useful with acids having no lubricating properties. Sizes 1" to 6".

Series 600 Valve is an entirely new type of lubricated valve developed by Duriron engineers. Lubricant chamber and cartridge at bottom of plug. A turn of pressure screw lubricates the bearing surfaces and frees the plug. Sizes 1" to 6".

Write for New Catalog

THE DURIRON COMPANY, INC.
445 N. Findlay St. Dayton, Ohio

Corrosion-Resisting Alloys

DURIMET DURCO KA2SMo
for Hot Sulphite Liquors

DURIRON for Alum
DURICHLOR for Bleach

NECROLOGY

A. B. WEISSENBORN

President of the Appleton Wire Works, Appleton, Wisconsin, Albert B. Weissenborn passed away June 2 at the age of 74. He had been in poor health for some time.

With William Buchanan and G. E. Buchanan, Mr. Weissenborn founded the Appleton wire firm in 1896, the first concern of its kind in the middle west. G. E. Buchanan, secretary and treasurer, passed away April 9 (cf. *Paper World*, p. 55, May, 1938). Most of the equipment in the plant was designed by Mr. Weissenborn and he helped in devising the power shuttle which assured more speed and accuracy in production. The system of welding wires to remove the seams is also credited to Mr. Weissenborn.

Mr. Weissenborn was also vice-president of the Tuttle Press Company, Appleton, and a director of Northern Paper Mills, Green Bay, Wisconsin. He is survived by his daughter.

◆

E. J. WILLIAMSON

Associated with the Aull Brothers Paper Company, Dayton, Ohio, for 49 years, Eddie J. Williamson passed away in the Miami Valley Hospital recently at the age of 72. He had retired from the company in 1932. While with the paper box company he was city salesman and had a wide circle of friends. He is survived by his wife.

◆

▶▶▶ General manager of the Watab Paper Company, Sartell, Minn., from 1915 to 1935, *O. L. E. Weber* passed away May 30 in Rome, Italy, at the age of 71. Mr. and Mrs. Weber sailed from New York recently for a three months vacation in Europe. Mr. Weber was formerly associated with Port Huron Sulphite and Paper Company, Port Huron, Michigan, and the Forest Products Laboratories, Madison, Wisconsin. He is survived by his widow.

◆

ART W. BLACKMAN

Well known in the merchant trade, Arthur Wright Blackman, president of the D. F. Munroe Company, Boston, passed away May 2 at his home in Cambridge, Mass. A life-long exponent of better methods of cost accounting and better mill-merchant relationships, Mr. Blackman had lived to see many of his reforms adopted and had been honored with the presidency of the National Paper Trade Association and with the New England Paper Merchants Association. His widow and three children survive him. Two sons, Floyd H. and John F. will continue the successful coarse paper business of the D. F. Munroe Company, which their father had led for 29 years.

◆

ELON H. HOOKER

Prominent during his entire life as a figure of national importance as well as being one of the leading authorities on hydro-electrical engineering, Elon Huntington Hooker, president and

Elon Huntington Hooker

founder of the Hooker Electrochemical Company, passed away May 10 at Pasadena, Calif. He was 69 years of age.

Few men, either in the past or present, can claim a more active or versatile life than did Mr. Hooker, for not only was he possessed of a remarkable knowledge pertaining to his industrial career, but he was also concerned with national and international questions and his experience and judgment had been much sought in national and industrial projects.

Highlights in his career include the building of Boston's water supply; examination of the Panama and Nicaragua Canal routes; his appointment by Theodore Roosevelt as Deputy-Superintendent of Public Works for the State of New York, at which time he was placed in charge of the reorganization of the Erie Canal; his chairmanship of the National Industries Conference Board; his candidacy for the Republican nomination for Governor of New York in 1920 and his leadership of the Manufacturing Chemists Association from 1923 to 1925.

Mr. Hooker is survived by his widow and four daughters. Memorial services were held in New York on May 23.

◆

▶▶▶ Twenty three years Chicago representative of the Pittsburgh Piping & Equipment Company, Pittsburgh, Pa., *Berford Brittian*, 62, passed away May 22 at his residence in Hinsdale, Illinois. Mr. Brittian had been associated with the Pittsburgh firm since 1915.

◆

▶▶▶ Recognized as an authority in the paper industry, *Malcolm M. Barr*, 64, passed away recently at Salt Lake City. Mr. Barr was on leave of absence from his firm, Buntin, Reid Co., Ltd., Toronto, but was en route to Canada when stricken. He was formerly employed by the Zellerbach Paper Company, Seattle, and was also associated with Blake, Moffatt and Towne, paper distributors of Fresno, California.

◆

▶▶▶ *John Edward Lipman*, vice-president of the Taylor-Logan Paper Manufacturers of Holyoke, Mass., passed away recently after a short illness. Mr. Lippman was a past president of the Purchasing Agent's Association and was a native of South Hadley, Mass. He is survived by his widow.

◆

▶▶▶ *John F. Patton*, sales manager of the Brompton Pulp and Paper Company, Quebec, passed away May 3 in Montreal. Throughout his business career he was associated with the pulp and paper industry in Canada and the United States. He is survived by his widow, five sons and one daughter.

◆

LEWIS L. ALSTED

For more than twenty years president of the Combined Locks Paper Company, Appleton, Wisconsin, Lewis L. Alsted passed away May 21 in Chicago after an illness of several days. He was 63 years old.

Mr. Alsted was born in Nashville, Tenn., but moved later to Milwaukee, Wisconsin. After his graduation from

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FINISH AND SPEED

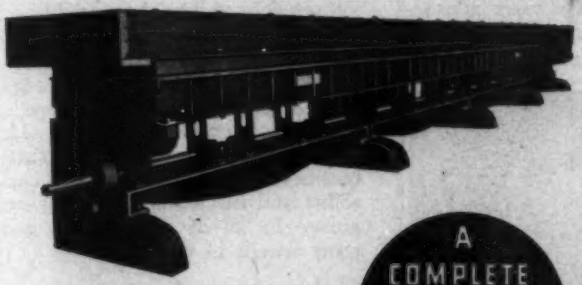
HEARTY GREETINGS!

We approach the Superintendents' Convention with the satisfactory feeling of "Good Work Well Done." TENAX FELTS continue to render perfect service. We pledge our constant and continuing aim to maintain this record—through diligence, research and cooperation.

"Non-Users Are The Losers"

LOCKPORT FELT COMPANY

Newfane, N. Y. — U. S. A.



A COMPLETE LINE OF FLAT SCREENS

This New Murray Flat Screen is equipped with a special drive developed to meet exacting and heavy duty requirements with high speed. A modern equipment for the mill that must improve quality and cut operation costs to meet all competition. Quiet in operation. Efficient, these screens will do a better job of cleaning your pulp. No vibration, no pounding, no clatter. Highest efficiency, with lowest maintenance and lowest power costs. This drive can also be installed on your present screens. Write for prices on screens you require to modernize your mill. Remember, we make all sizes and types of construction to fit every requirement.

D. J. Murray Mfg. Co.

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REDUCE PUMPING COSTS

You pay for a pump, once. But you continue to pay pumping costs throughout the life of that pump. Perhaps your present pumping costs are higher than they need be—higher than they would be, with a LAWRENCE CENTRIFUGAL on the job. Why not ask us, as pumping engineers, to make a free check-up of your present costs? No obligation, whatever.

LAWRENCE MACHINE and PUMP CORP'N
367 Market Street LAWRENCE, MASS.

LAWRENCE CENTRIFUGAL PUMPS

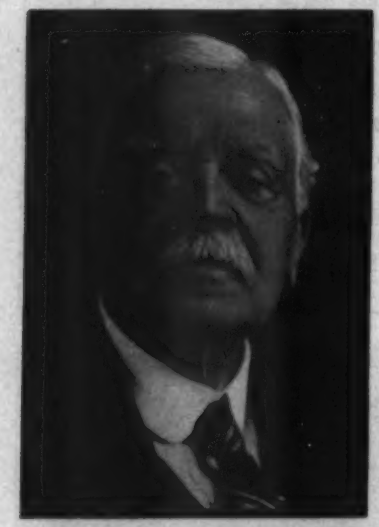
the University of Wisconsin he was admitted to the bar but gave up the practice of law to engage in the paper industry. At one time he owned the controlling interest in the former Lakeview Paper Company at Neenah, Wisconsin.

Mr. Alsted was widely-known among paper mill executives and had contributed liberally to charity and community enterprises. He is survived by his widow and a daughter.

◆

FRANK P. CARPENTER

Active until a recent date as president of the Amoskeag Paper Mills, Manchester, N. H., Frank Pierce Carpenter, 92, passed away April 13. His connection with the pulp and paper



Frank P. Carpenter

industry dated from his earliest years. He had been president of the Amoskeag Paper Mills since 1885.

Mr. Carpenter was one of New England's most benevolent and charitable men, having established the Carpenter Memorial Library in Manchester and aided Dartmouth College and having benefited hospitals, art galleries and other enterprises. Surviving Mr. Carpenter are a son, Aretus Carpenter who now heads the Amoskeag Paper Mills, and a daughter.

◆

▸▸▸ *Mrs. W. F. Ashe,* wife of the Thilmany Pulp and Paper Company's personnel director, passed away May 7 at the family home in Kaukauna, Wisconsin. She was 55 years of age and had been in poor health for two years but had been prominent in church and civic affairs. Mr. and Mrs. Ashe were married in 1908.

◆

▸▸▸ Engaged in logging operations for Price Brothers and Company, *Davy Bolduc,* 28, was drowned May 23 in the Cloutier stream, a tributary of the Trompeuse River in Canada. He was attempting to loosen a pile-up of logs when the accident occurred.

◆

TWO MEN KILLED

Isidore Thibodeau, 39, was killed instantly and Ernest Seguin, 23, died two hours later as a result of an accident which occurred on May 23 in the shipping department of the Canadian International Paper Company's mill at Hawkesbury, Ontario. The men were engaged in taking down 400-pound pulp bales from a high pile when some of the bales tumbled down and crushed them.

◆

WALTER J. RAYBOLD

Walter J. Raybold, president of the Rising Sun Paper Company, Great Barrington, Mass., passed away April 22 after a brief illness. He was 74 years old.

Mr. Reybold began his career as a clerk in the Agawam Paper Company, of West Springfield, Mass., was advanced to sales manager, and, in 1899, became one of the organizers of the B. D. Rising Paper Company, predecessor to the Rising Paper Company. He served for many years as vice-president and treasurer of the original company.

Walter J. Raybold

Mr. Raybold was a native of Lanesboro, Mass., and was educated in the Pittsfield schools. He was a director of the American Paper Exports Association of New York. Surviving Mr. Raybold are his widow and two daughters.

RICHARD C. LEWIS

Richard C. Lewis, sales engineer of the Farrel-Birmingham Company, Inc., Ansonia, Conn., was killed on May 24, a victim of the tragic plane crash near Cleveland, Ohio, which took the lives of nine other passengers. At the time of his death, Mr. Lewis was manager of the rolling mill sales division of the

Richard C. Lewis

Farrel-Birmingham Company in charge of sales of rolling mill equipment and roll grinding machines.

Mr. Lewis was well known in the paper industry as an experienced and capable engineer with a thorough knowledge of the design and operation of roll grinding machines. He was highly esteemed for his personal qualities as well as for his professional ability and his passing is deeply regretted by all of his associates and many friends in the trade.

◆

▸▸▸ *Mrs. Florence Caesar,* wife of Charles V. Caesar, managing director of the E. B. Eddy Company, Hull, Quebec, passed away at her home in Ottawa on May 12.

◆

C. M. SALMONSEN

Christian M. Salmonsen, formerly assistant mill manager of Oxford Paper Company, Rumford, Maine, and later with International Paper Company, at North Tonawanda and Niagara Falls in the same capacity, passed away June 4, at Portland, Maine, after a long illness. Mr. Salmonsen was 46 years of age. He was a graduate of Dartmouth College and was in the World War prior to his connection with the Oxford Company.

A widow and daughter survive.

PULP MILL MACH'Y ◆ FINISHING ROOM MACH'Y
◆ FRICTION CLUTCHES ◆

THE MOORE & WHITE CO.
PHILADELPHIA, PA.
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MORRIS
CENTRIFUGAL PUMPS
Write for interesting and useful bulletin on Non-Clogging Pumps for handling pulp, and centrifugal pumps for other mill processes and services.
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VEST POCKET POWER PLANTS
Small space occupied, any capacity, low over-all operating costs, high and extreme efficiencies, reliability, low initial investment.
Complete power plants to meet any operating conditions of Pulp and Paper mills or other Industrial service. Engineering and Construction.
Satisfactory Services Always Guaranteed.
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Power Specialists
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729,290 Tons Annually (2,330 Tons Daily) of Clean Southern Kraft Pulp
are being handled by 22 APMEW Knotters and 28 APMEW Screens in new Kraft Mills of the South. What a large tonnage of CLEAN PULP is being produced by such a small number of Knotters and Screens! 22 horsepower connected to the Knotters, removes the coarse material and knots from this huge tonnage. 980 horsepower connected to the APMEW Screens, screens this huge tonnage, producing CLEAN PULP.
CLEAN PULP IS BEING PRODUCED — WITH EFFICIENCY!

TEN CENTS per ton pays for these 22 APMEW Knotters and 28 APMEW Screens in one year. SAVINGS in power, labor, maintenance, repairs, etc.; usually repay the investment in less than one year, and thereafter makes good earnings.
AMERICAN PAPER MACHINERY & ENGINEERING WORKS, Inc.
GLENS FALLS, NEW YORK

Who Pays For Accidents?

Impressive . . .
A large paper manufacturer employing approximately 1,000 workers started an intensive safety program in 1925. During the following eight-year period they reported a $71,000 saving, despite the fact that employment had gradually increased as well as the payments under the State Compensation Law.

FEW executives realize that insurance covers only the direct losses from accidents, or one-fifth of the annual bill. As estimated by insurance authorities, the other four-fifths are indirect losses and are not insurable.

If it is important to have protection against 20% of the cost, how much more necessary is it to concentrate on the remaining 80%?

Practical and effective organization for safety as applied by the Paper and Pulp Section of the National Safety Council provides the solution. In the decade 1926-1936 several hundred organizations in this field have, as a group reduced the frequency and severity of accidents 64% and 61% respectively, a savings of millions of dollars within the industry.

A copy of "Organizing a Complete Industrial Safety Program," together with full information will be sent you gladly upon request. Simply drop us a line on company stationery.

PAPER & PULP SECTION NATIONAL SAFETY COUNCIL TWENTY NORTH WACKER DRIVE CHICAGO ILL.

CURRENT MARKET QUOTATIONS

RAGS (Domestic)
f. o. b. New York City

NEW RAGS — per cwt.

Blue Overalls	4.75 to 5.00
Corduroy	2.25 to 2.50
Cottons—	
Washables, No. 1	1.75 to 2.00
Fancy Percales	3.00 to 3.25
New Soft Blacks	3.25 to 3.50
New Light Seconds	1.65 to 1.75
New Dark Seconds	1.80 to 1.90
Khaki Cuttings—	
Mixed	3.25 to 3.50
O. D.	3.75 to 4.00
New Canvas	7.00 to 7.25
New Mixed Blacks	2.25 to 2.50
Shirt Cuttings—	
New White No. 1	6.25 to 6.50
Silesias No. 1	4.00 to 4.25
New Unbleached	5.75 to 6.00
Fancy	2.50 to 2.75

RAGS (Domestic)
f. o. b. New York City

OLD RAGS

	per cwt.
Roofing—	
No. 1	1.00 to 1.05
No. 2	.70 to .75
No. 3	.60 to .65
Twos and Blues—	
Repacked	1.50 to 1.60
Thirds and Blues—	
Repacked	1.30 to 1.40
Miscellaneous	1.05 to 1.15
White, No. 1—	
Repacked	3.25 to 3.50
Miscellaneous	2.75 to 3.00
White, No. 2—	
Repacked	2.25 to 2.50
Miscellaneous	1.50 to 2.00

RAGS (Foreign)
ex dock New York City

NEW RAGS — per cwt.

New Dark Cuttings	2.25 to 2.50
New Mixed Cuttings	2.00 to 2.25
New Light Silesias	4.75 to 5.00
Light Flannelettes	5.00 to 5.25
Unbleached Cuttings	6.50 to 6.75
New White Cuttings	6.75 to 7.00
New Light Oxfords	3.50 to 3.75
New Light Prints	2.75 to 3.00

RAGS (Foreign)
ex dock New York City

OLD RAGS — per cwt.

No. 1 White Linens	7.00 to 7.25
No. 2 White Linens	6.00 to 6.25
No. 3 White Linens	5.00 to 5.25
No. 4 White Linens	3.50 to 3.75
No. 1 White Cottons	4.00 to 4.25
No. 2 White Cottons	3.25 to 3.50
No. 3 White Cottons	2.50 to 2.75
No. 4 White Cottons	2.00 to 2.25
Extra Light Prints	2.50 to 2.75
Ord. Light Prints	2.00 to 2.25
Med. Light Prints	1.75 to 2.00
Dutch Blue Cottons	2.00 to 2.25
French Blue Cottons	2.10 to 2.30
French Blue Linens	2.75 to 3.00
Checks and Blues	1.75 to 2.00
Linsey Garments	1.30 to 1.60
Dark Cottons	1.10 to 1.15
Old Shopperies	1.00 to 1.05

ROPE and BAGGING
f. o. b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	2.20 to 2.30
Domestic	2.10 to 2.20
Wool Tares—	
Light	1.60 to 1.70
Heavy	1.80 to 1.90
Bright Bagging	1.40 to 1.50
Manila Rope—	
Foreign	2.50 to 2.75
Domestic	2.50 to 2.75
New Burlap Cuttings	2.15 to 2.25
Jute Threads—	
Foreign	2.50 to 2.75
Domestic	2.75 to 3.00
Strings—	
Sisal	1.50 to 1.60
Soft jute	1.65 to 1.75
Mixed	.40 to .50

WASTE PAPER
f. o. b. New York City

	per cwt.
Shavings—	
White Envp. Cuttings	2.25 to 2.35
Ord. Hard White No. 1	1.75 to 1.85
Ord. Soft White No. 1	1.60 to 1.70
Flat Stock—	
Stitchless	.70 to .75
Overissue Mags	.60 to .65
Solid Flat Book	.45 to .50
Crumpled No. 1	.35 to .40
Solid Ledger Books	1.30 to 1.40
Ledger Stock—	
White	.90 to .95
Colored	.45 to .50
New B. B. Chips	.12½ to .15
Manilas—	
New Env. Cuts	1.35 to 1.45
New Cuttings	1.15 to 1.25
Bogus Wrappers	.12½ to .15
No. 1 Old Kraft	.45 to .50
News—	
No. 1 Wh. News Cuttings	1.25 to 1.30
Strictly Overissue	.40 to .45
Strictly Folded	.20 to .25
No. 1 Mixed Paper	.07½ to .10

CHEMICALS
f. o. b. shipping point

Alum (Papermakers)—	
Lump, cwt.	3.40 –
Ground, cwt.	3.15 –
Powdered, cwt.	3.55 –
Blanc Fixe—	
Bulk, ton	40.00 to 42.50
Barrels, pound	.0325 to .035
Bleaching Powder—	
Drums, cwt.	2.00 to 2.25
Casein (Domestic Standard)—	
Ground (bags), lb.	.073 to .08
Fine grd. (bags), lb.	.08 to .085
China Clay—	
Domestic Filler	
Bulk (mine) ton	6.50 to 12.00
Domestic Coating	
Bulk (mine) ton	11.00 to 20.00
Imported (ship side)	
Bulk (lump) ton	14.50 to 24.00
Chlorine—	
Tank cars (wks) cwt.	2.15 to 2.55
Gelatine (silicin) lb.	.0475 to .05
Glyc. (C.P.) drums, lb.	.155 to .16
Litharge, bbl., lb.	.0633 to .066
Rosin (Gum)—	
Savannah, 280 lb. barrel	
E, per bbl.	4.95
F, per bbl.	5.20
G, per bbl.	5.50
WW, per bbl.	7.60
Rosin (Wood), per bbl.	5.05
Salt Cake—	
Dom. bulk (wks) ton	13.00 to 15.00
Imp. bulk on dock—	
(Atl. ports) ton	14.50 to 15.00
Soda Ash—	
Bulk (works) cwt.	.90 –
Paper Bags, cwt.	1.05 –
Barrels, cwt.	1.25 –
Soda (Caustic)—	
Solid, drums, cwt.	2.15 to 2.20
Ground and flake, drums, cwt.	2.50 to 2.60
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.85 to 2.00
40 deg., 35 gal. drums, (works) cwt.	.80 to 1.20
Starch—	
Pearl, 140 lb. bags, cwt.	2.65 –
Pearl, barrels, cwt.	2.90 –
Paper (Sp.) bags, cwt.	2.75 –
barrels, cwt.	3.00 –
Sulphur (crude)—	
(mine) bulk, ton	18.00 to 23.00
Talc—	
Dom. 100 lb. bags (mine) ton	15.00 to 18.00
Imp. bulk, ton	35.00 to 40.00
Titanium Dioxide—	
Ba. Fig., bbls., lb.	.05½ to .06¼
Ca. Fig., bbls., lb.	.05½ to .06¼
Zinc Sulphide, bbls., lb.	.09 to .095

CHEMICAL PULP
(Air-dry ton)

	per cwt.
Soda (Dom.) del'd. mill—	
Bleached	2.90 –
Sulphate (Dom.) f. o. b. mill—	
Bleached	3.00 to 3.25
Kraft No. 1	2.50 to 2.75
Kraft No. 2	1.75 to 2.00
Sulphate (Imp.) on dock—	
Bleached	3.00 to 3.25
Kraft No. 1	2.00 to 2.25
Kraft No. 2	1.75 to 2.00
Sulphite (Dom. & For.) On dock—	
Prime bleached	2.75 to 3.25
Prime easy bleach	2.50 to 2.75
Prime strong unbl.	2.00 to 2.50

MECHANICAL PULP
(Air-dry ton)

	per ton
No. 1 Dom. & Can. (f. o. b. mill)	19.00 to 22.00
No. 1 Imp. (On dock)—	
Moist	26.50 to 27.50
Dry	25.00 to 26.00

PAPER
f. o. b. New York City

	per ton
Boards—	
Binders	72.00 to 75.00
Chip	27.50 –
Chip, spl. mla. li.	42.50 to 45.00
Coated, white patent	
.016	60.00 to 65.00
.020 and heavier	55.00 to 60.00
Kraft liner	30.00 to 32.50
News	27.50 –

	per cwt.
Book (cased)—	
No. 1 Glossy Coat	10.50 to 14.25
No. 2 Glossy Coat	9.30 to 12.25
No. 3 Glossy Coat	8.25 to 11.00
No. 4 Glossy Coat	7.70 to 10.50
No. 1 Antique	7.50 to 10.50
No. 2 Offset	7.10 to 9.90
A Grade E. F.	6.90 to 9.50
A Grade Super	7.15 to 9.75
B Grade E. F.	6.40 to 8.75
B Grade Super	6.65 to 9.00
C Grade E. F.	6.10 to 8.50
C Grade Super	6.35 to 8.75
D Grade E. F.	5.85 to 8.25
D Grade Super	6.10 to 8.50
Ivory & India	.50 cwt. extra

	per cwt.
Bonds (Rag Content)—	
100% Rag	
Ext. No. 1	41.40 to 48.80
100% Rag	32.80 to 38.80
85% Rag	
75% Rag	24.75 to 29.00
65% Rag	21.65 to 26.25
50% Rag	18.70 to 22.75
25% Rag	15.80 to 19.25
Regular Colors	1.50 cwt. extra
Heavy Colors	3.00 cwt. extra

	per cwt.
Bonds (Sulphite)—	
No. 1	8.80 to 10.15
No. 2	7.90 to 9.20
No. 4	7.00 to 8.30
Colors	1.00 cwt. extra
Glassine (f. o. b. mill)—	
Embossed (25 lb. up)	12.25 –
Bleached (25 lb. up)	11.25 –
Unbleach (25 lb. up)	9.50 –
Greaseproof—	
Bleach. (25 lb. up)	9.50 –
Unbleach. (25 lb. up)	9.00 –
Ledgers (Rag Content)—	
100% Rag	
Ext. No. 1	42.55 to 50.00
100% Rag	33.95 to 39.75
85% Rag	31.65 to 37.25
75% Rag	25.90 to 30.50
65% Rag	22.80 to 27.75
50% Rag	19.90 to 24.25
25% Rag	16.95 to 20.75
Regular Colors	1.50 cwt. extra
Heavy Colors	3.00 cwt. extra
Ledgers (Sulphite)—	
No. 1	9.95 to 12.00
No. 2	9.05 to 11.00
No. 4	8.20 to 10.00
News—	per ton
Rolls (Contract)	50.00 –
Rolls (Spot)	(nominal)
Sheets	58.00 –
Tissues (Carlots)—	per ream
Anti-Tarnish M. G.	.75 –
Colored	.875 –
Kraft	.75 –
Manila	.60 –
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.48 –
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.52 –
Toilet, Bleached (M shts.) per cs.	4.40 to 5.00
Toilet, Unbleached (M shts.) per cs.	2.75 to 3.00
Towels—	per case
Bleached	3.10 to 3.56
Unbleached	1.80 to 3.30
Wrappings (Kraft)—	per cwt.
Extra Quality	5.00 to 5.50
Super-Standard	4.75 to 5.00
Northern Standard	4.25 to 4.50
Southern Standard	4.00 to 4.25
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f. o. b. mill)	
Bleached papers—	
M.F. & M.G. Waxing	per cwt.
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(10,000 lbs.)	6.25 –
Drug wrapp. 35 lb.	5.50 –
Unbleached Papers—	
Com. Grd. Butch. 40 lb.	4.25 –
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No. 1 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.625 –
No. 2 Imit. Parch & Dry Fin. Groc. Sulphite 30 lb.	4.375 –
Steam Finish, 50 lb.	3.625 –
Water Finish, 40 lb.	4.25 –
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Envp. Mla., Sub. 16-40 (No. 1)	5.25 –
Envp. Mla., Sub. 16-28 (No. 2)	5.00 –
Envp. Mla. (Prices based on large sheets untrim'd ream-marked, in bdls.)	
Wrapp. Mla. 35 lb. up—	
No. 1	5.00 –
No. 2	4.75 –
M. G. Sulphite (other than Waxing)	
Grade A-25 lb.	5.25 –
Grade B-25 lb.	4.75 –

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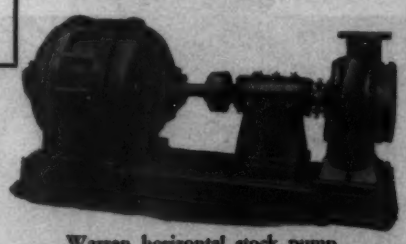

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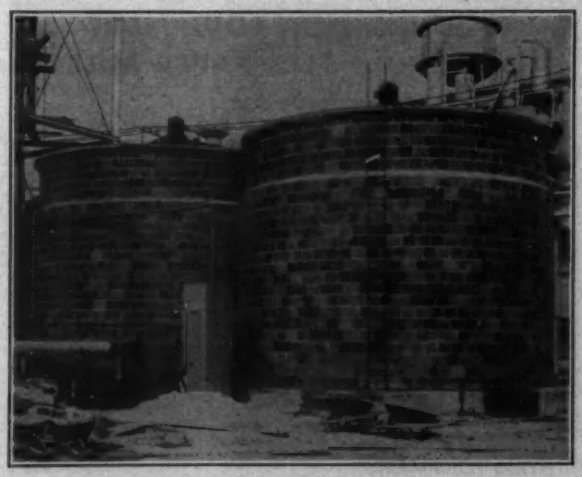

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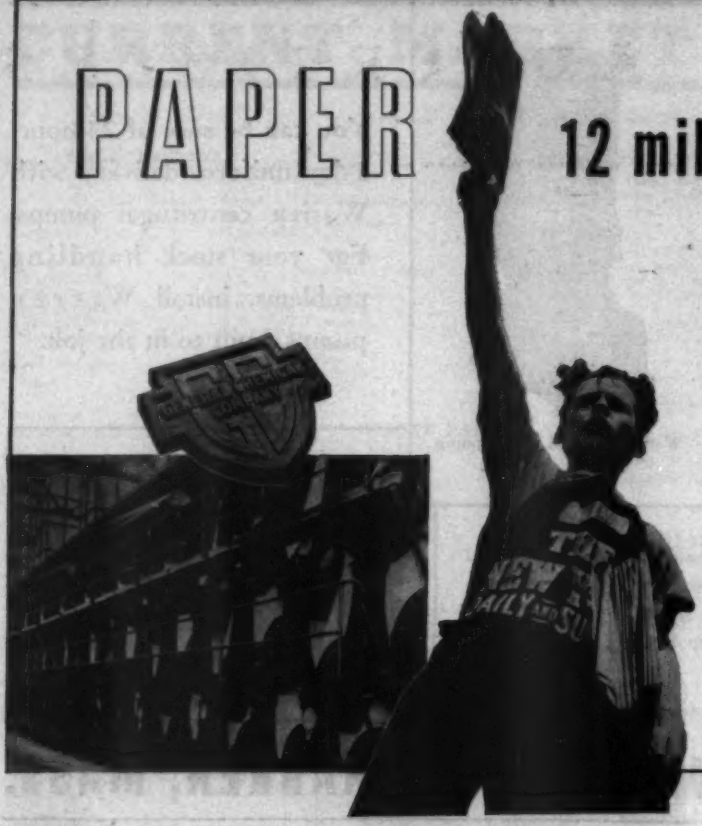

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